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Valuation of the Firm in the Presence of Temporary Book-Tax Differences: The Role of Deferred Tax Assets and Liabilities

David A. Guenther
University of Colorado at Boulder
Richard C. Sansing
Dartmouth College

ABSTRACT: This study uses an analytical model to investigate the value of the firm when there are temporary differences between when revenue and expense items are recognized for tax- and financial-reporting purposes. The model shows that deferred tax assets and liabilities transform book values of underlying liabilities and assets into estimates of the after-tax cash flows on which the firm's market value is based. The analysis shows that if tax deductions are taken on a cash basis, and if the underlying assets and liabilities are recorded at the present value of their associated future cash flows, then the value of deferred tax assets and deferred tax liabilities is their recorded amount, regardless of when the asset will be realized or when the liability will reverse. If tax deductions are not taken when the expenditure is made (e.g., depreciation) or if underlying assets and liabilities are recorded at more than the present value of their associated future cash flows (e.g., warranty liabilities), then the market value of deferred tax assets and deferred tax liabilities is less than their recorded values. The value of the deferred tax account is independent of when that account will reverse.

Key Words: *Deferred taxes, Depreciation, Cash flows, Valuation.*

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I. INTRODUCTION

This paper formally examines the market value of the firm in the presence of temporary differences between the recognition of revenues and expenses for tax and financial reporting purposes. The analysis provides insights about two aspects of the deferred tax asset and deferred tax liability accounts that arise because of the comprehensive interperiod allocation of tax expense required by generally accepted accounting principles in the U.S. First, the analysis indicates the conditions under which the book values of deferred tax assets and liabilities differ from their market values. Second, the analysis reveals how the valuation of deferred tax assets and deferred tax liabilities depends on whether and when the market expects the deferred tax accounts to reverse.

Sansing (1998) showed that a deferred tax liability caused by the use of different depreciation methods for book and tax was valuation relevant even if the firm's reinvestment strategy ensured that the deferred tax liability never reversed. Sansing (1998) also showed that the deferred tax liability arising from depreciation differences between book and tax reduced firm market value by an amount that was less than its book value. Our analysis extends Sansing (1998) in two ways. First, our focus is more general in that we examine the valuation of firms that have several different kinds of transactions whose income effects are recognized in different periods for book and tax. For example, we consider the case of liabilities that create book expenses now but tax deductions later. Our analysis shows that the valuation effect of such a liability and the associated deferred tax asset depends upon whether the liability is recorded at the present value of the expected cash payments (as in obligations associated with post-employment benefits other than pensions) or at its nondiscounted value (as in warranty liabilities). Second, we consider the case in which the firm's rate of reinvestment is less than the rate of economic depreciation, which ensures that the deferred tax asset and the deferred tax liability reverse.

We report two new results that have important implications for how deferred taxes and their reversals affect firm value. First, although the market value of a deferred tax liability relating to depreciation is less than its book value, the same is not true of deferred tax assets associated with expenses that are accrued for book purposes but not for tax purposes. The book and market values of deferred tax assets are equal in our model as long as the book value of the related liability is equal to the present value of the future cash flows needed to pay that liability. Therefore, deferred tax assets associated with liabilities that are recorded at their present value of the associated future cash flows (e.g., post-retirement health care benefits) have a market value equal to their book value. In contrast, deferred tax assets associated with liabilities that exceed the present value of future cash flows required to pay them (e.g., warranty liabilities) are worth less than their book value, because the related liability itself is also worth less than its book value.

Second, we demonstrate that the timing of the expected reversal of deferred tax assets and liabilities should have no effect on firm value. Deferred tax liabilities that are expected to reverse later are not worth less than deferred tax liabilities that are expected to reverse sooner; deferred tax assets that are expected to be realized quickly are not worth more than deferred tax assets that are expected to be realized slowly; and firms that avoid a reversal of deferred tax liabilities arising from differences between book and tax depreciation by reinvesting in new assets do not increase the value of the firm. The reason for this is that in order to delay the reversal of the deferred tax liability arising from depreciation differences, a firm must purchase new assets, which generate new accelerated tax depreciation. However, the present value of the tax savings from depreciation has already been reflected in the price of the new assets because in our model assets are zero net present value investments. Therefore, a firm that allows its deferred tax liability to reverse has the same value as a firm that keeps its deferred tax liability from reversing by purchasing new assets, because the firm does not increase its value by investing in zero net present value projects.

The fact that the timing of the reversal of the deferred tax asset or liability is not relevant to valuation conflicts with some recommended practices of financial analysts. For example, White et al. (1994, 537), in discussing how financial analysts should evaluate deferred tax liabilities, state that "an estimate of the timing of reversal would facilitate discounting the liability to its present value and analysis of future cash flows." This view that the timing of the reversal of deferred tax liabilities has valuation consequences is also found in academic accounting research. Givoly and Hayn (1992, 394) study the change in the value of deferred tax liabilities resulting from the tax rate reductions in the Tax Reform Act of 1986 and conclude that investors appear to discount the deferred tax liability "according to the timing and likelihood of the liability's settlement." Amir et al. (1997, 619), who use a different valuation method and a different time period, also find results that "are consistent with investors' valuation of deferred taxes depending on when these deferred taxes reverse."

It is important to emphasize what this study is *not* saying. First, we are not suggesting that deferred taxes have no implications for firm value. Deferred taxes affect current earnings, and also provide information that helps to predict future earnings, and current and future earnings clearly have implications for firm value. Also, empirical evidence from Beaver and Dukes (1972) has demonstrated a relation between security prices and earnings measured with deferred taxes.

Second, we are not suggesting that the use of accelerated tax depreciation has no cash flow implications. The ability to take a tax deduction sooner in the life of an asset rather than later will clearly maximize the present value of a firm's cash flows. Our results apply only to the timing of the *expected reversal* of the deferred taxes recorded on the financial statements, not to the timing of the tax deduction. Also, our results do not depend on whether a firm is growing, replacing old assets with new ones and generating new book-tax differences that offset the reversal of prior differences. Our results apply regardless of whether the firm is growing or contracting.

Section II presents our model of firm value and demonstrates the relation between book and market values of assets and liabilities. Section III demonstrates the irrelevance of the expected timing of deferred tax reversal on valuation. Section IV concludes the paper.

II. VALUATION

In this section, we develop a model of firm value in which we explicitly incorporate transactions that give rise to temporary book-tax differences. In the model, we examine the valuation implications of the accounting assets and liabilities created by such transactions, and the valuation implications of the associated deferred tax assets and deferred tax liabilities that such transactions create. We use this model to demonstrate both the valuation consequences of deferred taxes and the effect of the timing of the expected reversal of deferred tax assets and liabilities on firm value. The variables and parameters used in the model are summarized in Table 1.

The firm is assumed to earn an after-tax rate of return ρ on all current and future investments. The rate ρ is also assumed to be the firm's cost of capital, and this is the rate used to discount the dividend stream to the firm's stockholders. Therefore, we assume that the market value of the firm is equal to the present value of the dividend stream paid to the firm's stockholders. Furthermore, the market value of the firm is equal to the market

TABLE 1
Definitions of Variables and Parameters Used in the Model

ρ = The market rate of return on capital
c = The market price of one unit of physical capacity
α = Rate of asset reinvestment
λ = Rate of economic depreciation
δ = Rate of tax depreciation
β = Rate of book depreciation
u = Time
t = Corporate income tax rate
K(u) = Replacement cost of physical capacity on date u
V(u) = Tax basis of physical capacity on date u
B(u) = Book value of physical capacity on date u
y = Revenue minus variable production cost per unit
w = Undiscounted sum of future warranty expenditures per unit
θ = Rate at which warranty expenditures occur
ϕ = Fraction of future warranty expenditures accrued on sale date ($\phi = 0$ implies no accrual; $\phi = 1$ implies an accrual of the undiscounted future cash payments; $\phi = \theta/(\theta + \rho)$ implies an accrual of the present value of future payments)
L(u) = Warranty liability on date u
P(u) = Stock price on date u
DTA = Deferred tax asset
DTL = Deferred tax liability

value of its individual assets and liabilities, where each is valued at the present value of the after-tax cash flows associated with it. To simplify our analysis we ignore any stockholder-level taxes.

Assume that a firm acquires one unit of capital on date zero at a cost c per unit. The rate of economic depreciation of the capital is λ. Reinvestment in new capital occurs at a rate α, and thus the rate of net growth (or net depreciation, if negative) of capital is $\alpha - \lambda$ and the replacement cost of the firm's physical capital on date u, denoted K(u), is $ce^{u(\alpha-\lambda)}$. The capital base enables $e^{u(\alpha-\lambda)}$ units to be produced and sold on each date u.

The revenue minus current variable production cost is a constant y per unit sold. Each unit sold will generate w of future warranty costs. For each unit sold on date $\hat{u}$, the firm will incur warranty costs of $w\theta e^{-\theta(u-\hat{u})}$ on each subsequent date u.[1] The parameter θ determines how quickly the warranty costs will be incurred; a higher value of θ indicates that the costs will be incurred sooner. Note that because the discount rate is ρ, the present value of the future warranty costs associated with the sale of one unit on date $\hat{u}$ is:

$$\int_{\hat{u}}^{\infty} w\theta e^{-\theta(u-\hat{u})} e^{-\rho(u-\hat{u})} du = \frac{w\theta}{\theta + \rho}.$$

We begin by characterizing the pattern of after-tax cash flows. Total revenues (net of current variable production costs) of $ye^{(\alpha-\lambda)\hat{u}}$ are received on each date $\hat{u}$. On each subsequent date u, $u \geq \hat{u}$, the firm pays warranty costs at the rate of $w\theta e^{-\theta(u-\hat{u})}e^{(\alpha-\lambda)\hat{u}}$ for warranty costs associated with sales on date $\hat{u}$. Integrating over all of the dates $\hat{u}$ that precede an arbitrary date u* yields the total rate of pre-tax cash payments for warranties on date u*:

---

[1] For simplicity, we only consider two sources of book-tax differences, warranty costs and depreciation. Our results relating to the warranty costs apply equally to any transaction that is treated on a cash basis for tax purposes but is accrued (in whole or in part) for financial-reporting purposes.

$$\int_0^{u^*} w\theta e^{-\theta(u^*-\hat{u})}e^{(\alpha-\lambda)\hat{u}}\,d\hat{u} = \frac{w\theta[e^{(\alpha-\lambda)u^*} - e^{-\theta u^*}]}{\alpha-\lambda+\theta}. \tag{1}$$

Equation (1) represents the cash payments made by the firm for warranty claims on the current date u* with respect to sales made on all previous dates $\hat{u}$. Under current U.S. tax laws, expenses for warranty claims are only deductible in the year paid. Therefore, equation (1) also represents the amount of the firm's current period tax deduction for warranty expense.

We emphasize this feature of our model—that the cash flows for warranty claims exactly match the timing of the associated tax deductions—because this will not be the case for depreciation tax deductions, and that difference between the timing of cash flows and tax deductions will drive some of our results. For a depreciable asset the cash outflow occurs at the time the asset is purchased, whereas the tax deduction arises based on the statutory schedule of tax depreciation.

Taxable income on date u is equal to pretax cash flow from operations (i.e., revenues net of variable production costs minus cash payments for warranty claims) minus tax depreciation of the capital base. The income tax paid on date u is equal to the taxable income multiplied by the tax rate t. The capital base depreciates for tax purposes at a rate δ. The tax basis of the capital base on date u, denoted V(u), is:

$$V(u) = \left[c - \frac{\alpha c}{\alpha-\lambda+\delta}\right]e^{-\delta u} + \frac{\alpha K(u)}{\alpha-\lambda+\delta}. \tag{2}$$

See Lemma 2(a) in Sansing (1998) for a proof. Because the investment earns an after-tax rate of return ρ, this implies:

$$c = \int_0^{\infty}[y(1-t) - \alpha c]e^{(\alpha-\lambda)u}e^{-\rho u}du + \int_0^{\infty}t\delta V(u)e^{-\rho u}\,du$$
$$-\int_0^{\infty}\frac{(1-t)w\theta[e^{(\alpha-\lambda)u} - e^{-\theta u}]e^{-\rho u}}{\alpha-\lambda+\theta}\,du. \tag{3}$$

The second term in equation (3) is the present value of tax savings from tax depreciation. Note that, unlike the warranty tax deductions, the depreciation tax deductions do not correspond to cash flows. Integrating equation (3) and simplifying yields:

$$c = \left[\frac{\delta+\rho}{\delta(1-t)+\rho}\right]\left[\frac{y(1-t)}{\lambda+\rho} - \frac{w\theta(1-t)}{(\lambda+\rho)(\theta+\rho)}\right]. \tag{4}$$

Next, we consider the firm's balance sheet on date u. We assume that the capital base depreciates for financial reporting purposes at a rate β, and thus the book value of the capital base on date u, B(u), is:

$$B(u) = \left[c - \frac{\alpha c}{\alpha - \lambda + \beta}\right]e^{-\beta u} + \frac{\alpha K(u)}{\alpha - \lambda + \beta}. \tag{5}$$

See Lemma 2(c) in Sansing (1998) for a proof.

The warranty liability on date u* depends on the extent to which the future warranty costs are accrued on the date the unit is sold. Generally accepted accounting principles (GAAP) provide different rules for different types of future costs associated with current sales, ranging from no current accrual to fully accruing the undiscounted future expenditures on the sale date. To reflect the full range of possible accounting treatments, we assume an accrual of ϕw is made on the date of sale for each unit sold. As warranty costs are paid in the future, we assume a fraction $1 - \phi$ is expensed and the remaining portion ϕ is debited to the warranty liability. For example, if $\phi = 1$, the undiscounted sum of all future warranty expenses is accrued for financial reporting purposes on the date of sale, and all future payments reduce the liability account. This is an important special case because product warranty liabilities are generally recorded at their full undiscounted amounts in the U.S. If $\phi = 0$, no expense is recognized on the date of sale, and all future payments are expensed. Finally, if $\phi = \theta/(\theta + \rho)$, the firm accrues the present value of all future warranty payments on the sale date. This is another important special case because liabilities yielding large book-tax differences, such as post-retirement health care benefits, are recorded at their present value.

Sales on date $\hat{u}$ generate an accrued warranty expense of $\phi w e^{(\alpha-\lambda)\hat{u}}$. The remaining unpaid liability on date u* is:

$$\phi w e^{(\alpha-\lambda)\hat{u}} - \int_{\hat{u}}^{u^*} \phi w \theta e^{-\theta(u-\hat{u})} e^{\hat{u}(\alpha-\lambda)}\, du = \phi w e^{(\alpha-\lambda)\hat{u}} e^{-\theta(u^*-\hat{u})}. \tag{6}$$

Integrating over all dates $\hat{u}$ that precede date u* yields the book warranty liability L on u*:

$$L(u^*) = \int_{0}^{u^*} \phi w e^{-\theta(u^*-\hat{u})} e^{(\alpha-\lambda)\hat{u}}\, d\hat{u} = \frac{\phi w[e^{(\alpha-\lambda)u^*} - e^{-\theta u^*}]}{\alpha - \lambda + \theta}. \tag{7}$$

Note that L(u*) equals the product of (1) the undiscounted sum of all future pretax warranty payments associated with sales on or before u* and (2) the fraction ϕ of the warranty costs that was accrued on the date of sale.

Generally accepted accounting principles require the recognition of deferred taxes to reflect temporary differences between tax and book income. Under SFAS No. 109, the deferred tax asset or liability is the difference between a book-basis and tax-basis balance sheet multiplied by the tax rate. In this setting, the warranty liability from equation (7) has no tax-basis counterpart, because warranty expenses are not deducted for tax purposes until they are paid. The deferred tax asset, denoted DTA, on date u* is:

$$\mathrm{DTA} = \frac{t\phi w[e^{(\alpha-\lambda)u^*} - e^{-\theta u^*}]}{\alpha - \lambda + \theta} = tL(u^*). \tag{8}$$

The deferred tax liability, denoted DTL, is the difference between the book and tax basis of the asset multiplied by the tax rate, so:

$$\mathrm{DTL} = t[B(u^*) - V(u^*)]. \tag{9}$$

The stock price on date u*, P(u*), is equal to the present value of the future cash flows from the investment (discounted at rate ρ), and thus satisfies:

$$\begin{aligned} P(u^*) = {} & \int_{u^*}^{\infty} [y(1-t) - \alpha c] e^{(\alpha-\lambda)u} e^{-\rho(u-u^*)}\,du + \int_{u^*}^{\infty} t\delta V(u) e^{-\rho(u-u^*)}\,du \\ & - \int_{u^*}^{\infty} \frac{(1-t)w\theta[e^{(\alpha-\lambda)u} - e^{-\theta u}]e^{-\rho(u-u^*)}}{\alpha - \lambda + \theta}\,du. \end{aligned} \tag{10}$$

Substituting V(u) from equation (2), integrating equation (10), and substituting V(u*) yields:

$$\begin{aligned} P(u^*) = {} & \frac{e^{(\alpha-\lambda)u^*}y(1-t)}{\rho + \lambda - \alpha} - \frac{e^{(\alpha-\lambda)u^*}\alpha c\left[1 - \dfrac{\delta t}{\delta + \rho}\right]}{\rho + \lambda - \alpha} \\ & + \frac{\delta t V(u^*)}{\delta + \rho} - \frac{w\theta(1-t)}{\alpha - \lambda + \theta}\left[\frac{e^{(\alpha-\lambda)u^*}}{\lambda - \alpha + \rho} - \frac{e^{-\theta u^*}}{\theta + \rho}\right]. \end{aligned} \tag{11}$$

The first term in equation (11) reflects the present value of the after-tax cash flows associated with future sales. The second term reflects the present value of the after-tax cash flows associated with future investments. The third term is the present value of future tax savings from depreciation associated with investments that were made in the past. The fourth term reflects the present value of after-tax cash flows associated with future warranty expenditures.

Substituting c from equation (4) and L(u*) from equation (7) yields:

$$P(u^*) = K(u^*) - \frac{\delta t}{\delta + \rho}[K(u^*) - V(u^*)] - \frac{L(u^*)\theta(1-t)}{\phi(\theta + \rho)}. \tag{12}$$

Equation (12) shows that the stock price can be decomposed into three elements: the replacement cost of the capital base, an adjustment for the difference between the replacement cost and tax basis of the capital base, and the future warranty payments associated with sales that occurred on or before u*. The first term indicates that with no difference between tax and economic depreciation (i.e., $\delta = \lambda$) and no warranty payments, the stock price equals the replacement cost of the firm's capital base, K(u*).

The second term reflects the value of tax deductions associated with the difference between the replacement cost and the tax basis of the firm's assets arising due to the difference between tax and economic depreciation. The difference between the replacement cost and tax basis of the assets is multiplied by the term $\delta t/(\delta + \rho)$, which reflects the present value of the tax deductions associated with the difference. To see the intuition behind this term, note that the present value of depreciation deductions associated with one unit of capital with pre-tax cost c is $\int_0^\infty t\delta c e^{-\delta u} e^{-\rho u}\,du = c\delta t/(\delta + \rho)$. Over the life of the asset a unit of capital costing c will reduce taxes by tc, and the present value of these tax deductions is $c\delta t/(\delta + \rho)$. To the extent there is a difference between the replacement cost and tax basis of assets, the replacement cost reflects some depreciation tax savings that the firm has already realized, and the replacement cost is therefore an overstatement of the after-tax value of the assets to the firm.

The third term is the present value of future after-tax cash flows associated with warranties on products sold on or before u^*. The term $L(u^*)/\phi$ represents the undiscounted future cash payments associated with these warranties. The term $1 - t$ puts this on an after-tax basis, and the term $\theta/(\theta + \rho)$ discounts these future payments to their present value.

Next, we characterize the stock price in terms of the firm's assets and liabilities as they are recorded by the financial accounting system, plus a term $[K(u^*) - B(u^*)]$ that reflects the difference between the replacement cost of the firm's physical assets and their book value. Equation (12) can be restated as:

$$P(u^*) = B(u^*) + [K(u^*) - B(u^*)]\left[1 - \frac{\delta t}{\delta + \rho}\right] - \frac{\delta}{\delta + \rho}\,\mathrm{DTL} - \frac{1}{\phi}\frac{\theta}{\theta + \rho}\,[L(u^*) - \mathrm{DTA}]. \tag{13}$$

Equation (13) shows that the value of the firm can be expressed as a linear combination of all values on the balance sheet, plus a term that captures the after-tax effect of the difference between the replacement cost and book value of the firm's capital stock. However, the coefficients on these terms need not be 1. Thus, in this model, valuation is not strictly accounting based—there has to be an adjustment to the accounting-based linear combination of balance sheet values for the fraction of the difference between the replacement and book values of the capital stock. Such a difference will exist whenever there is a difference between book and economic depreciation.

In order to highlight our focus on the after-tax valuation coefficients associated with accounting constructs, we eliminate this difference between replacement cost and book value by assuming that economic and book depreciation are the same, i.e., $\lambda = \beta$. Given this assumption, equation (13) simplifies to:

$$P(u^*) = B(u^*) - \frac{\delta}{\delta + \rho}\,\mathrm{DTL} - \frac{1}{\phi}\frac{\theta}{\theta + \rho}\,[L(u^*) - \mathrm{DTA}]. \tag{14}$$

Equation (14) makes clear that the market value of the deferred tax liability is $\delta/(\delta + \rho)$ of the book value of the liability. The DTL represents tax benefits from accelerated tax depreciation that the firm has already realized, but that would be available to a new purchaser of the asset, and are thus reflected in the asset's replacement cost. Thus, the DTL may be thought of as a valuation adjustment to reconcile the asset's replacement cost with the asset's value to the firm. The view that the DTL arising from accelerated tax depreciation is part of the process that converts the book value of firm assets to their firm-specific after-tax market value contrasts with the prevailing view that the DTL is a liability.

The DTL is discounted because the replacement cost of the asset reflects the discounted future cash flows relating to additional tax depreciation that would be available to a new purchaser of the asset. Subtracting the DTL from replacement cost removes this additional tax depreciation and reconciles replacement cost with the firm-specific after-tax fair market value of the asset. However, the DTL reflects the full (undiscounted) value of tax savings from additional tax depreciation, while replacement cost reflects the net present value of this same tax savings. The tax savings reflected in the DTL are larger than the same (discounted) tax savings reflected in replacement cost, and therefore one must apply the same discount to the DTL as that reflected in replacement cost to equalize the two values. These results are consistent with the empirical findings in Amir et al. (1997), who found that the coefficient on deferred tax liabilities associated with book-tax depreciation differences is significantly less than 1.

In contrast, the market value of the deferred tax asset arising from the product warranty term in our model is equal to its book value as long as the book value of the associated liability equals the present value of the future cash flows required to pay the liability, i.e., as long as $\phi = \theta/(\theta + \rho)$. The value of the deferred tax asset associated with liabilities that are discounted, such as post-retirement health care benefits, is equal to its book value because $\phi = \theta/(\theta + \rho)$. Unlike the case of the depreciable assets, the present value of the cash flows relating to the warranty liability, $w\theta/(\theta + \rho)$, is equal to the present value of all the future tax deductions. Consequently, no discounting of the deferred tax asset is called for when $\phi = \theta/(\theta + \rho)$.

If future expenditures are not discounted, then $\phi = 1$ and the related deferred tax asset is overvalued by a factor of $\rho/(\theta + \rho)$. Consequently, the deferred tax asset should be discounted to offset the fact that the book value of the related liability is overstated relative to its market value.

Note that in each case, the valuation coefficient on the liability, $L(u^*)$, is equal to the valuation coefficient on the deferred tax asset. Any difference between the book value and market value of the deferred tax asset simply reflects a difference between the book value and the market value of the associated liability.

III. REVERSAL

In this section, we consider the effects of the expected reversal of deferred taxes on firm value. Whether and when DTA and DTL reverse in our model depends on whether the reinvestment rate, α, is greater than or less than the rate of economic depreciation, λ. Consider the expressions for DTA and DTL in equations (8) and (9), respectively. In each case, the amount of deferred taxes is zero on date zero and diverges from zero over time. When $\alpha \geq \lambda$, this divergence is permanent; the deferred taxes never reverse. When $\alpha < \lambda$, the deferred taxes gradually converge back to zero over time. As we stated in the introduction, there is a widespread belief that deferred tax liabilities should be discounted because the liability may not reverse for many years. However, equation (13) shows that the valuation coefficients on DTA and DTL are $\theta/\phi(\theta + \rho)$ and $\delta/(\delta + \rho)$, respectively. Because these valuation discounts are independent of both α and λ, they do not depend on either whether or how quickly the deferred taxes reverse.

In contrast to the conventional wisdom that suggests that the proper value of deferred taxes somehow depends on the future investment behavior of the firm, our result shows that the timing of the reversal has no value relevance. To provide additional insight into the intuition behind this result, we present an example in Table 2 that uses the parameters

TABLE 2
Example of Two Firms with Different Deferred Tax Liability Reversal

	Firm X	*Firm Y*
Initial balance sheet at date u = 0		
Assets:		
Machine	c	c
Liabilities and owner's equity		
Deferred tax liability	tc	tc
Owner's equity	$c(1 - t)$	$c(1 - t)$
Fair market value of stock:		
At date u = 1 (from equation (12))	$ce^{-\lambda}(1 - t)$	$ce(1 - t)$
PV of date 1 stock price at date 0 (A)	$ce^{-\lambda-\rho}(1 - t)$	$ce^{-\rho}(1 - t)$
Year 1 cash flows:		
Initial dividend (tax refund) (B)	tc	tc
Future dividends on date u	$y(1 - t)e^{-\lambda u}$	$(y - \lambda c)(1 - t)$
Present value of year 1 dividends (C)	$\frac{y(1 - t)(1 - e^{-\lambda-\rho})}{\lambda + \rho}$	$\frac{(y - \lambda c)(1 - t)(1 - e^{-\rho})}{\rho}$
Value of firm on date u = 0		
(A) + (B) + (C)	c	c
Balance sheet on date u = 1		
Assets:		
Machine	$ce^{-\lambda}$	c
Liabilities and owner's equity		
Deferred tax liability	$tce^{-\lambda}$	tc
Owner's equity	$(1 - t)ce^{-\lambda}$	$(1 - t)c$

Both firms initially invest in one asset (at cost c) that has economic (and book) depreciation at rate λ. The asset is expensed immediately for tax purposes, resulting in an immediate tax refund equal to tc. The refund is immediately paid to shareholders as a dividend. Firm X continues to use the single asset and to pay out all future cash flows to shareholders as dividends. Firm Y reinvests an amount equal to λc each year in new equipment, maintaining the book value (and productive capacity) of its asset at a constant amount c.

All variables are as defined in the model in the paper.
y = pre-tax revenues net of variable costs
t = tax rate
$w = 0$ (no warranty costs)
δ = infinity (immediate expensing for tax purposes)
c = initial cost of asset

from the model to compare the market values of two firms with similar assets but different deferred tax liability reversals. To help the reader understand our results, we make several simplifying assumptions in this example: there are no warranty costs (i.e., $w = 0$); asset purchases are expensed immediately for tax purposes (i.e., δ = infinity); one firm (Firm X) pays out all cash flows as dividends to shareholders, while the other firm (Firm Y) continuously reinvests an amount equal to the economic depreciation of the asset (λc), thus maintaining the book value and productive capacity of the asset at c, and the deferred tax liability at tc. Note that Firm X's deferred tax liability will gradually reverse, while Firm Y's remains constant. Note that because asset purchases are expensed immediately for tax purposes, the tax deduction would then match the cash flows, and thus no discounting is necessary.

Table 2 presents balance sheets for the two firms in the example, and also uses the parameters of the model to compute and compare the fair market value of the two firms at date 0. The fair market value of a firm at date 0 consists of three components: (A) the present value of the fair market value of the firm at date 1; (B) the initial date 0 dividend (equal to the tax refund from expensing the purchase of the asset for tax purposes, tc); and (C) the present value of dividends received between date 0 and date 1. As Table 2 demonstrates, the fair market values of both firms at date 0 equal c, the initial cost of the machine, regardless of the fact that the deferred tax liability for Firm X reverses, while the deferred tax liability for Firm Y remains constant. Firm Y prevents the reversal of the deferred tax liability by reinvesting in new zero net present value assets, but this investment does not increase the market value of the firm.

This result is similar in spirit to the dividend irrelevance proposition in Miller and Modigliani (1961). The firm in our model chooses whether to reinvest and pay less in dividends (high α) or not reinvest and pay more dividends (low α). Because investments have zero net present value, the value of the stock $P(u^*)$ does not depend on α, and the coefficients on the firm's deferred tax assets and liabilities in a valuation equation similarly do not depend on α.

IV. CONCLUSION

This study contains two new results regarding the value of deferred taxes. First, we show that the value of deferred tax assets associated with costs that are accrued for financial reporting purposes but not for tax purposes equals its book value provided the associated liabilities equal the present value of future cash flows needed to pay them. Any difference between the book and market value of the deferred tax asset simply reflects a difference between the book and market value of the associated liability. Second, we show that the expected timing of the reversal of deferred tax assets and liabilities has no effect on firm value.

The results of this study make an important contribution to both academic accounting research as well as to financial statement analysis. Financial statement analysis texts that suggest deferred tax liabilities should be discounted based on the expected time of reversal are incorrect. In addition, results of prior accounting research into the value of deferred taxes, such as Givoly and Hayn (1992) and Amir et al. (1997), have been interpreted as reflecting valuation consequences of the expected timing of the reversal of the deferred tax. Our model shows that the timing of expected deferred tax reversals should not affect the value of the firm.

Finally, accounting standard setting bodies could consider these results in making decisions about accounting for income taxes. For example, SFAS No. 109 does not require discounting deferred taxes based on the expected time to reversal. The U.K. Accounting Standards Board is currently considering whether to revise U.K. GAAP to require discounting of deferred tax liabilities based on their expected time to reversal. The results of our model support SFAS No. 109, and suggest that a change in U.K. GAAP to discount deferred taxes based on expected time to reversal is not warranted.

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Disclosure Effects in the Laboratory: Liquidity, Depth, and the Cost of Capital

Robert J. Bloomfield
T. Jeffrey Wilks
Cornell University

ABSTRACT: Greater disclosure quality leads to higher prices and greater liquidity in a laboratory financial market, and these effects are stronger when investors face the risk of unpredictable demand shocks. These results are consistent with a broad class of theoretical and empirical studies. Disclosure has larger effects on prices and liquidity at greater market depths. We conclude that archival studies looking only at quoted transaction prices and spreads (which typically pertain to small transactions) may underestimate the potential importance of disclosure on larger transactions that occur at greater market depths.

Key Words: *Disclosure, Liquidity, Cost of capital, Experimental economics.*

Data Availability: *Data from this study are available from the authors upon request.*

I. INTRODUCTION

A growing body of empirical studies demonstrates that informative disclosures can increase the market price and liquidity of a firm's securities. For example, Welker (1995) and Healy et al. (1999) find that better disclosure (as measured by the ratings of the Financial Analysts Foundation) is associated with smaller bid-ask spreads. Coller and Yohn (1997) show that management forecasts also reduce bid-ask spreads. In a cross-sectional study, Botosan (1997) shows that among firms without a large analyst following, those with higher-quality disclosures (as measured by her own objective measure of the contents of annual reports) have higher prices, after controlling for other factors affecting price. Byrd et al. (1995) find that management meetings with analyst groups increase prices, and Piotroski (1999) shows that improved disclosure about business segments also increases market prices.

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Researchers have proposed various explanations for these effects. Diamond and Verrecchia (1991) construct a model in which higher-quality disclosure increases prices and liquidity by reducing the adverse selection that investors face in future trading.[1] Amihud and Mendelson (1986), while not addressing disclosure directly, establish that improvements in liquidity will also increase prices because investors demand less of a premium to cover the likely cost of closing out their positions in the future. In these models, as well as less formal discussions (e.g., Lev 1988), disclosure effects arise from two aspects of investor demand: a demand for securities with more certain payoffs, and a demand for securities that will have small transactions costs when a position must be closed.

To examine these aspects of demand in a controlled laboratory setting, we manipulate (1) the extent to which disclosures reduce uncertainty and (2) the likelihood that investors experience demand shocks which force them to close out their investment positions without warning. In our experiment, a main effect of disclosure on price and liquidity would reflect investors' greater demand for securities with less uncertain payoffs (the direct effect of disclosure). An interaction between disclosure and demand shocks would reflect investors' greater demand for disclosure-induced liquidity when they face potential demand shocks (the indirect effect of disclosure). Our experiment avoids other potential causes of disclosure effects such as changes in investor following or adverse selection, neither of which can change in our markets.

The exogenous manipulation of disclosure is intended to capture the effects of changes in disclosure quality. Regulations by the SEC and FASB mandating levels of disclosure can be viewed as requiring firms to provide a certain level of disclosure quality, regardless of their own motivations to do so. An exogenous manipulation of disclosure quality limits our ability to speak to the large literature on managers' endogenous disclosure choices, and investors' responses to those choices. However, this aspect of our experimental design also allows us to draw clear inferences that any observed effects of disclosure are caused by investors' demand for low payoff uncertainty and high liquidity, rather than from endogenous correlations between investors' needs and managers' disclosure choices.[2]

Our experiment also allows us to measure the effects of disclosure across different market depths. Most archival studies examine market bids and asks, which represent the prices at which relatively small trades are or could be executed. However, more complete measures of prices and liquidity must also consider the prices at which larger trades would be executed (Grossman and Miller 1988; Lee et al. 1993). Our clearinghouse markets are designed to allow such measures. Investors enter complete demand schedules that specify how many shares they will buy or sell over a broad range of possible prices (cf. Smith et al. 1982; Friedman 1993; Cason and Friedman 1996). Aggregating these demand schedules yields a net demand schedule that specifies total market supply and demand at each price.

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[1] Consistent with Diamond and Verrecchia (1991), we define disclosure quality as the precision of a Bayesian investor's beliefs about security value after receiving the disclosure. A disclosure that produces a more compact posterior distribution for a given set of priors is said to be of higher quality. Disclosure quality can be defined in many other ways. For example, in the absence of anti-fraud rules, disclosure quality can be defined as the degree of self-interested bias in the disclosure (see King 1996). Disclosure quality can also be defined as the ease with which investors can read and interpret financial statements. Such a definition is useful in interpreting the experimental studies of Hopkins (1996).

[2] Lang and Lundholm (1993, 1996), Bartov and Bodnar (1996), Healy et al. (1999) and Coller and Yohn (1997) show that disclosure choices by firm are associated with a number of factors, including institutional ownership, firm size, and perceived information asymmetry. Thus, in settings of endogenous disclosure choice, apparent disclosure effects might reflect the work of an omitted variable that affects disclosure as well as price and liquidity; alternatively, high prices and liquidity may cause high disclosure (rather than the reverse). See King (1996) for a study of the effects of reliable disclosures in a setting in which disclosure reliability is endogenous.

This schedule allows us to measure how much an additional investor would increase (decrease) the market price if they attempted to buy (sell) a fixed number of shares. As in rational expectations models (e.g., Diamond and Verrecchia 1991), the more the price moves in response to the additional investor's trade of a given quantity, the less liquid the market is said to be. By altering the number of shares an investor attempts to trade, we can assess market liquidity at various depth levels. We can also assess how much liquidity a specific investor provides to the market by measuring how much another investor would need to pay or accept in order to induce that particular investor to trade.

Analyses of individual investors' demand schedules provide strong support for our predictions. At all depth levels, better disclosure quality leads investors to demand shares at higher prices and to provide a greater degree of liquidity. Moreover, these effects are significantly larger when investors face potential demand shocks, consistent with an indirect effect of disclosure arising because investors value liquidity more when they face such shocks. Investors appear to be insuring themselves against payoff uncertainty and unanticipated demand shocks by investing more in cash (a perfectly liquid, riskless security), thereby reducing demand for (and the price of) risky securities. If disclosure for the risky security is high, investors insure themselves less, and the price and liquidity of the risky security increase.

Analyses of market (aggregate) demand schedules show that the effects of disclosure are only weakly apparent at shallow depth levels. However, at greater depths (i.e., when considering an investor who attempts to sell many shares to the market), disclosure significantly increases market bids and liquidity. Moreover, these effects of disclosure are stronger when the market faces potential demand shocks. Disclosure effects are stronger at greater depths in part because an investor who attempts to trade more shares is asking other investors to alter their holdings by a greater amount. Depth also matters because prices and liquidity at shallower depths reflect the behavior of only the marginal investors, rather than the average investor. The market bid at a depth of one share is set by the investor who is least worried about payoff uncertainty. As a result, altering the degree of payoff uncertainty will have a relatively small effect on the market price and liquidity at shallow depths.

Analyses of investors' asking prices reveal a surprising result—asking prices behave quite differently from bid prices. Unlike bids, asks are affected only by disclosure, not by either demand shocks or the interaction of disclosure and demand shocks. Moreover, high disclosure decreases selling prices, although selling prices remain on average above expected value. While selling prices in excess of expected value are inconsistent with expected utility theory, they are consistent with the widely observed endowment effect in which people demand greater prices to sell an asset they already own (Kahneman et al. 1990; see also Odean 1998; Weber and Camerer 1998). Interestingly, market-level analyses show that endowment effects vanish at shallow depths, presumably because the marginal sellers in the market are the ones who succumb least to the effect. In this way, our results resemble those of Kachelmeier (1996), who also reports an individual bias that is eliminated at the market level.

Overall, our results confirm that both the direct and indirect effects of disclosure can be important, even when investor following and adverse selection are held constant. Allowing these factors to vary (as in the model of Diamond and Verrecchia [1991]) would most likely cause disclosure to have even greater effects. Thus, our results suggest that regulations mandating higher disclosure quality are likely to increase both prices and liquidity for firms, and will have larger effects when investors face greater uncertainty about their future demand. Our results also suggest that archival studies that look only at transaction prices and quoted bid-ask spreads may be underestimating the *potential* importance of disclosure, which has the largest effect in our markets at greater depths. Thus, we reinforce the cautions of Grossman and Miller (1988, 628) and Callahan et al. (1997, 57–58) that research on disclosure should be cautious about focusing too much on transaction prices and spreads.

The remainder of the paper is organized as follows. Section II describes the details of the experiment. Sections III and IV present the results of the study. Section V provides a summary of our conclusions, and indicates directions for future research.

II. THE EXPERIMENT

Overview

This section describes the basic characteristics of our laboratory markets, and also the features of the experimental design that allow us to draw clear inferences from the results. The following definitions will be helpful in following the description of the experiment. A "cohort" is a group of five participants who always trade together. A "security" is a claim on a terminal dividend, denominated in a laboratory currency called "francs." A "security pair" is a set of two independent securities that are traded simultaneously. Trading in a security pair consists of a sequence of trading rounds (or simply rounds) during which each investor enters a pair of demand schedules. A session is a three-hour time span during which a cohort trades many security pairs.

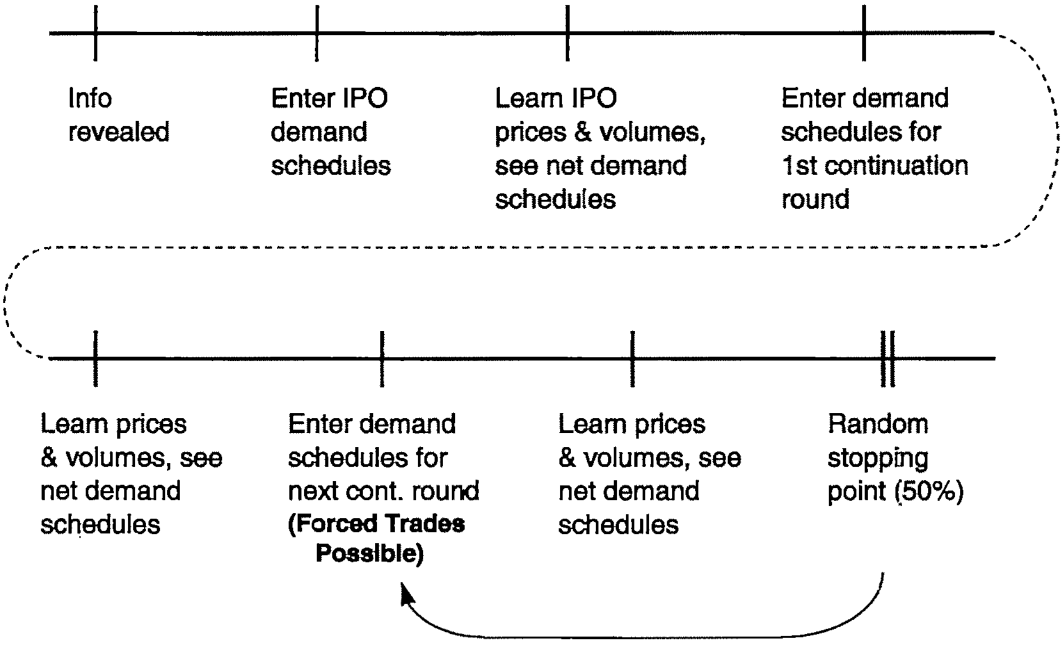
Trading a Security Pair

All trade takes place in a clearinghouse market similar to that used by Smith et al. (1982), Friedman (1993), and Cason and Friedman (1996). The clearinghouse market has two specific advantages for the study of security prices and liquidity. First, because the intermediary is entirely passive (unlike experiments using specialist or dealer markets), differences across markets cannot be due to differences across intermediaries. Second, by eliciting a complete demand schedule from each investor, we collect a wealth of information not available in other laboratory settings (such as the single-unit double auction) or in real-world exchanges. For example, the demand schedule provides a natural measure of liquidity by indicating how much an investor who wishes to buy (sell) shares must increase (decrease) the market price in order to induce another investor to sell (buy) those shares. Despite these advantages, it is important to note that relatively little is known about the properties of the clearinghouse market (relative to better known institutions such as the single-unit double auction). Thus, caution should be exercised in generalizing the results of this market to other exchange mechanisms.

Figure 1 provides a timeline of trading for each security pair. Before trading a security pair, each investor receives a cash endowment of 50,000 francs. This large endowment, relative to the cost of each security (roughly 2,100 francs), is intended to reduce the risk of bankruptcy, which could distort investors' risk preferences. In the first round of trading, each firm issues 20 shares of its securities to investors. Because these shares are offered by the firm to investors, we refer to the first trading round as the initial public offering or IPO. In subsequent rounds of trading, investors may buy and sell shares among themselves. We call these "continuation" rounds. There is a 50 percent chance that the second continuation round is the last round of trade for any given security pair. If trade continues, there is a 50 percent chance of the next round being the last. Thus, there is a 50 percent chance of 3 trading rounds (including the IPO round), a 25 percent chance of 4 rounds, a 12.5 percent chance of 5 rounds, and so on. This random stopping point for each security pair forces investors to plan for future trades in a stationary environment because in each round after the second, the expected number of subsequent trading rounds is the same (cf. King 1996). Participants never know whether the current round is the last until the round is over.

FIGURE 1
Timeline of Trade for a Security Pair

In the first round of trade, each firm issues 20 shares of its securities to investors (the initial public offering [IPO]). For each security, each investor enters a complete demand schedule specifying the number of shares they wish to purchase at every allowable price. A computer determines the prices that induce investors to purchase exactly 20 shares of each security. Investors then learn these prices, how many shares they purchased at those prices, and the complete net demand schedules for the securities. Continuation trading rounds are similar, except that no additional shares of each security are issued by the firm, and investors may either buy or sell securities. In the demand-shocks cells of our design, investors may be forced to buy or sell shares starting in the second continuation (i.e., third) round. Trade in a security pair stops after the third round with a 50 percent chance, after the fourth round with a 25 percent chance, and so on.


Info revealed
Enter IPO demand schedules
Learn IPO prices & volumes, see net demand schedules
Enter demand schedules for 1st continuation round
Learn prices & volumes, see net demand schedules
Enter demand schedules for next cont. round **(Forced Trades Possible)**
Learn prices & volumes, see net demand schedules
Random stopping point (50%)

For each security in each trading round, an investor uses a graphical interface to enter a complete demand schedule specifying the number of shares they wish to buy or sell at every possible price. The investor accomplishes this task by setting eight cutoff prices, each of which represents the price at which the investor's demand for or supply of shares changes by one share. Each cutoff price can be manipulated individually or with the help of various buttons as described in Panel A of Figure 2. The only restrictions on trading are that (1) investors' demand schedules cannot slope upward at any point, and (2) investors cannot buy shares that do not exist or sell shares they do not own (short-selling is not permitted). Panel A of Figure 2 shows a trading screen seen by an investor who has just set her demand schedules in the first continuation round. Once all investors submit their schedules, a computer determines the market-clearing price at which supply equals demand. (If there is a range of such prices, the computer chooses the midpoint.) Investors then learn the market-clearing price, the trading volume at that price, and the volume they personally traded in that round for each security. Investors also observe their current holdings in securities and francs, as well as the complete net demand and supply schedule for each security, as seen in Panel B of Figure 2.

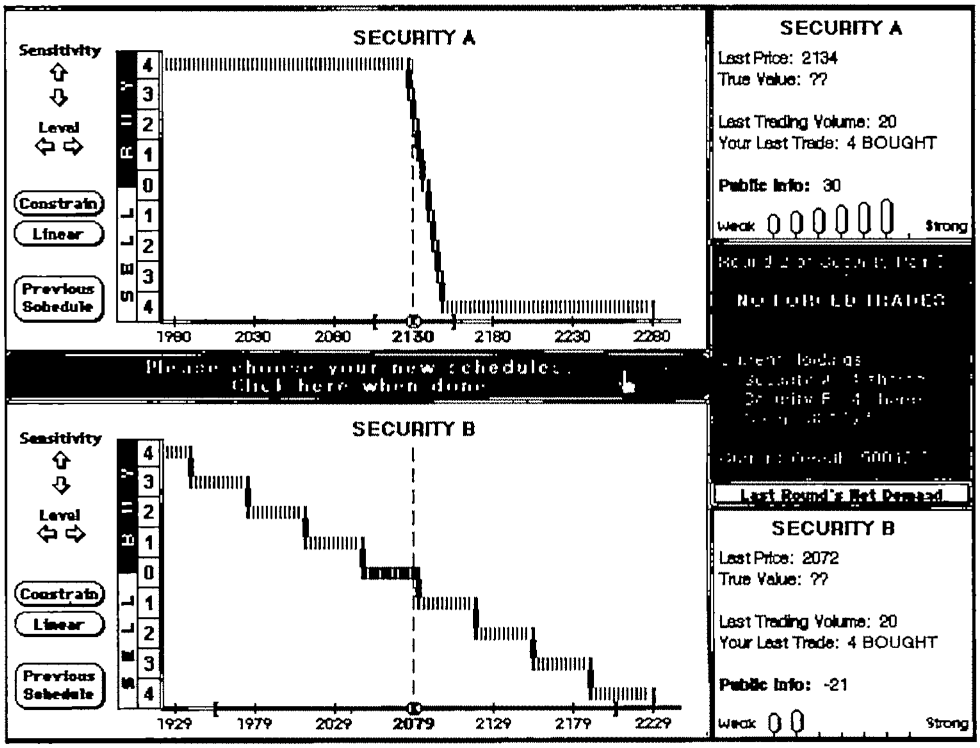
Disclosure Manipulation

Every security has a value equal to 2,100 francs plus the sum of seven numbers (signals) chosen randomly from the interval [−25, +25]. We create securities with high-quality disclosure by disclosing six of the seven signals to all investors. We create securities with low-quality disclosure by disclosing only two of the signals to all investors. Thus, disclosure

FIGURE 2
Trading Screens

Panel A: Demand Schedule Entry Screen for First Continuation Round

Security A represents high-quality disclosure (investor receives six signals) while Security B represents low-quality disclosure (investor receives two signals). The demand function is the downward sloping line that connects the eight cutoffs. Each cutoff, $c_{x,y}$, represents the price at which an investor is indifferent between trading x shares and y shares, as indicated on the quantity axis. Each cutoff can be moved individually. The sensitivity up (down) button increases (decreases) the steepness of the demand function by rotating all cutoffs clockwise (counterclockwise) around the midpoint between the fourth and fifth cutoffs. The level right (left) button increases (decreases) the price levels at which the investor is willing to buy or sell by shifting all cutoffs to the right (left). The constrain button shifts all cutoffs into the range of possible values given the number of signals. The linear button shifts the cutoffs so as to form a straight line between the first and last cutoffs.



Please choose your new schedules.
Click here when done

SECURITY A
Last Price: 2134
True Value: ??

Last Trading Volume: 20
Your Last Trade: 4 BOUGHT

Public Info: 30

SECURITY B
Last Price: 2072
True Value: ??

Last Trading Volume: 20
Your Last Trade: 4 BOUGHT

Public Info: -21

(Continued on next page)

can be interpreted as the decrease in variability of the possible values a security can take. When investors know six of the seven signals, the variance in security values after disclosure is 208 francs; when investors know only two signals, the variance in security values after disclosure is 1,042 francs.[3]

Each cohort trades the same number of low- and high-disclosure securities. Half of each cohort's security pairs include one high-disclosure and one low-disclosure security, one quarter includes two high-disclosure securities, and the other quarter includes two low-disclosure securities. This design allows us to examine not only how a security's price is influenced by its disclosure quality, but also how it is influenced by the disclosure quality of other securities in the market.

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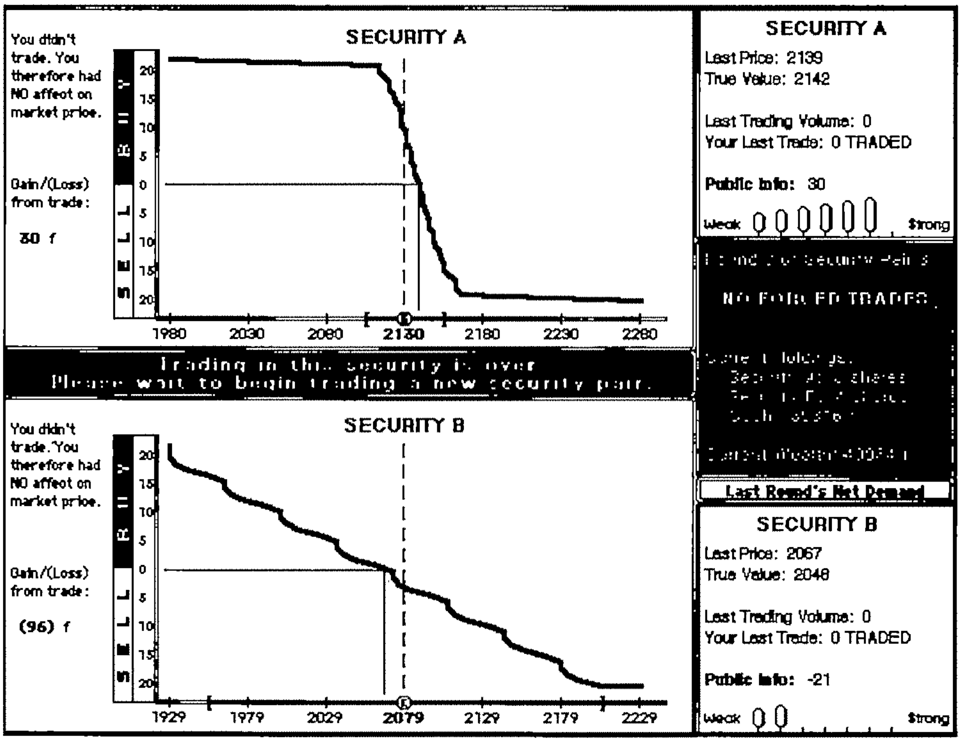
[3] Our information quality measure can be directly linked to the unbiased normally distributed signal used in Diamond and Verrecchia (1991). The mean of the signals disclosed in our experiment provides an unbiased estimate of the mean of all seven signals, which can be converted directly into security value. The fewer signals disclosed, the larger the variance in this estimate, and the lower quality the disclosure.

FIGURE 2 (Continued)

Panel B: Aggregate Demand Schedule and Results Screen for a Continuation Round

The net demand schedule for each security depicts the net demand at every price. For example, the net demand schedule for Security A indicates that at a price of Fr 1,985, the market demands 20 shares more than are available. At a price of Fr 2,180, the market offers to sell 20 shares more than are demanded. At Fr 2,139, the market demand is exactly equal to the market supply, so the net demand is zero. This is the market-clearing price for this round.



SECURITY A

You didn't trade. You therefore had NO affect on market price.

Gain/(Loss) from trade:

30 f

Trading in this security is over.
Please wait to begin trading a new security pair.

SECURITY B

You didn't trade. You therefore had NO affect on market price.

Gain/(Loss) from trade:

(96) f

SECURITY A

Last Price: 2139
True Value: 2142

Last Trading Volume: 0
Your Last Trade: 0 TRADED

Public Info: 30

[illegible]

NO FORCED TRADES.

[illegible]

Last Round's Net Demand

SECURITY B

Last Price: 2067
True Value: 2048

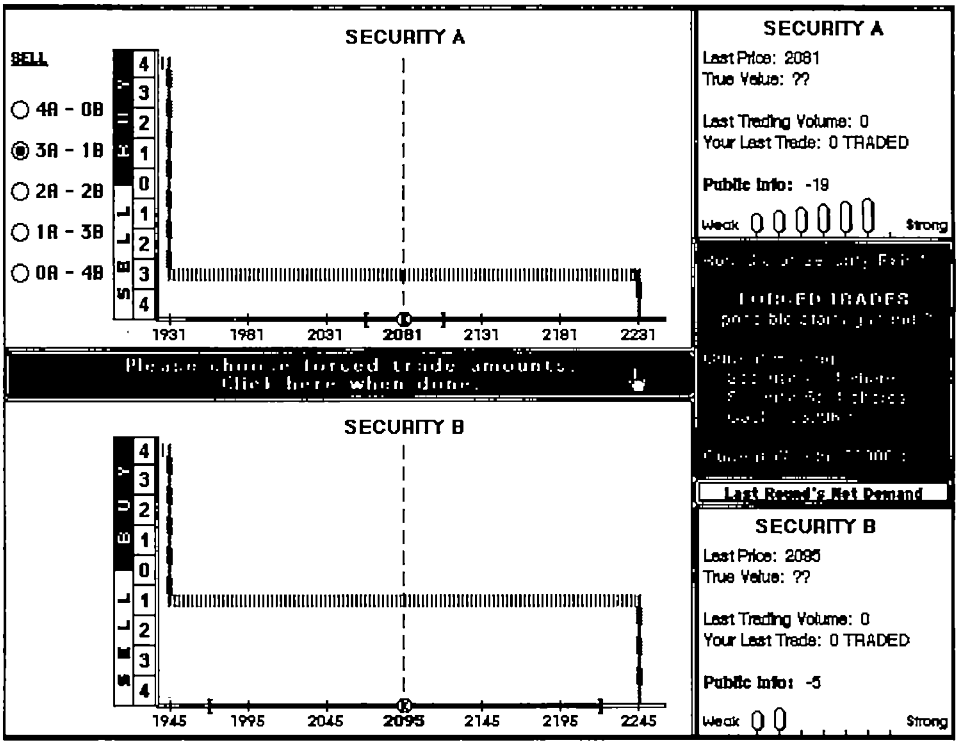
Last Trading Volume: 0
Your Last Trade: 0 TRADED

Public Info: -21

(Continued on next page)

FIGURE 2 (Continued)

Panel C: Demand Schedule Entry Screen for Second Continuation Round with Demand Shocks
Security A represents high-quality disclosure (investor receives six signals) while Security B represents low-quality disclosure (investor receives two signals). When forced to sell or buy a certain number of shares, the investor must decide how to allocate the trade between the two securities. In this example, the investor is forced to sell exactly four shares and chooses to sell three shares of Security A and one share of Security B at any price. Investors make this choice by clicking on the desired pairing combination on the left of the screen.



SELL

○ 4A - 0B
● 3A - 1B
○ 2A - 2B
○ 1A - 3B
○ 0A - 4B

Please choose forced trade amounts.
Click here when done.

SECURITY A
Last Price: 2081
True Value: ??

Last Trading Volume: 0
Your Last Trade: 0 TRADED

Public Info: -19

FORCED TRADES

SECURITY B
Last Price: 2095
True Value: ??

Last Trading Volume: 0
Your Last Trade: 0 TRADED

Public Info: -5

Demand-Shock Manipulation

We manipulate demand shocks by altering the probability that investors will be forced to trade their securities. In no-demand-shock settings, trades are never forced. In demand-shock settings, in contrast, two investors are chosen at random in each trading round *after the first continuation round,* and are forced to trade shares. Both investors are either ***both*** forced to buy four shares or ***both*** forced to sell four shares. These forced trades reflect investors' unpredictable needs to raise cash (in the case of forced sales) or invest cash in equity markets in order to earn a reasonable return (in the case of forced purchases).[4] There are never any forced trades in the IPO round or the first continuation round.

---

[4] Our demand shocks are denominated in the number of shares investors must buy or sell, rather than in the amount of cash investors must raise or invest. While the latter characterization (used in Bloomfield and O'Hara [1998]) might be more realistic, the two characterizations are nearly identical in our market because security values have high means (2,100 francs) and relatively low variances. As a result, an investor seeking to raise a given amount of cash (say 8,000 francs) needs to sell the same number of shares (four) regardless of whether the market price is high or low in that round. We design the experiment in this way to make it easier for subjects to understand the forced trading rules.

Panel C of Figure 2 shows the screen of an investor who is forced to sell four shares. The investor chooses to sell three shares of Security A and one share of Security B. This choice corresponds to demand schedules that reflect a willingness to sell three shares of Security A at any price (as shown on the upper price graph), and one share of Security B at any price (as shown on the lower price graph). Note that investors who are forced to trade have no discretion over the price at which they trade—they must trade at the market price.

Experimental Design

The experiment manipulates three primary factors: the disclosure quality of the security in question (high/low), the disclosure quality of the other security traded in that pair (high/low), and demand shocks (yes/no). These three factors are arranged in a 2 × 2 × 2 within-subjects design. As illustrated in Figure 3, cohorts 1–4 trade an equal number of securities in each of the eight cells of the design, as do cohorts 5–8. This use of within-subjects manipulations improves the power of our tests, because each cohort serves as its own control.

Our experiment differs from previous laboratory market studies in a very important way. Many previous studies focus on the difference between the observed market price and the price that would be attained if the markets fully revealed all information (Plott and Sunder 1988; Forsythe and Lundholm 1990; Lundholm 1991; Bloomfield 1996a; Bloomfield and Libby 1996). This price can typically be computed because the fully revealing price involves no uncertainty, and risk preferences become irrelevant. As a result, statistical tests in these studies compare the observed price with a point prediction of the

FIGURE 3
Experimental Design

The experiment uses a 2 × 2 × 2 design. The factors are demand shocks (yes/no), disclosure quality of Security A (high/low), and disclosure quality of Security B (high/low). In the table below, the first letter represents the level of disclosure quality for Security A and the second letter represents the level of disclosure quality for Security B. For example, security pairs 1–4 are traded by cohort 1 in the "LH-No Demand Shocks" cell of the design, which means Security A has low-quality disclosure, Security B has high-quality disclosure, and investors do not face demand shocks. The order of manipulations is balanced in a Latin-squares design.

	Security Pairs 1–4	*Security Pairs 5–8*	*Security Pairs 9–12*	*Security Pairs 13–16*	*Security Pairs 17–23*	*Security Pairs 24–30*	*Security Pairs 31–37*	*Security Pairs 37–44*
	No Demand Shocks				*Demand Shocks*			
Cohort 1	LH	LH	LL	HH	LH	LH	LL	HH
Cohort 2	LL	HH	LH	LH	LL	HH	LH	LH
Cohort 3	HL	HL	HH	LL	HL	HL	HH	LL
Cohort 4	HH	LL	HL	HL	HH	LL	HL	HL
	Demand Shocks				*No Demand Shocks*			
Cohort 5	LH	LH	LL	HH	LH	LH	LL	HH
Cohort 6	LL	HH	LH	LH	LL	HH	LH	LH
Cohort 7	LH	HL	HH	LL	HL	HL	HH	LL
Cohort 8	HH	LL	HL	HL	HH	LL	HL	HL

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equilibrium price.[5] In our study, equilibrium prices and liquidity levels always involve responses to risk. Because we do not control participants' risk preferences, we do not have any computable point prediction against which to compare behavior. For this reason, most of our tests focus on how behavior *differs across settings* as a result of our manipulations of disclosure quality and demand shocks.

The focus on differences across settings caused by our manipulations requires us to exercise careful control over other factors that might cause differences in behavior. Our design controls two such factors: the securities traded and the order in which cohorts are exposed to our treatments. As shown in Figure 3, each cohort trades the same securities (i.e., those with the same realizations of signal values) in the same order. However, each cohort experiences the eight cells in different orders, balanced in a Latin-squares design, with each security traded in each of the eight cells. This design reduces the likelihood that differences across settings are due to learning behavior or to differences in the securities traded in the different settings.

Incentives and Instructions

Each cohort participates in two experimental sessions. In the first session, participants read the instructions (shown in the Appendix) which are also reviewed orally by an administrator. Participants then trade three security pairs for practice with no incentive. In the second session, the instructions are reviewed again, and participants trade another three security pairs for practice with no incentive. The practice securities are not used in the data analysis.

Winnings from trading are determined by computing an investor's total wealth at the end of the experiment, and subtracting a "floor" of 49,800 francs/security pair from that amount. We then multiply the remaining wealth by a conversion rate of \$0.0067/franc in session 1 and \$0.0033/franc in session 2. To avoid risk-seeking behavior by investors who may be near or below the floor, we do not tell participants either the floor or the conversion rate. We tell them only that average winnings will be approximately \$30 per person per session. Winnings from one session do not carry over into another, and winnings from one security or security pair do not alter the cash endowment for the next (which is always 50,000 francs).

III. MAIN RESULTS

Hypotheses

We predict that higher-quality disclosures will lead investors to pay more for securities and to provide more liquidity, and that demand shocks will have the opposite effect. Because investors should value liquidity more when they face demand shocks, we also predict that disclosure will have greater effects when investors face demand shocks. We test these hypotheses at both the individual and market levels.

Individual Behavior

To test these predictions at the individual level, we examine investors' demand schedules in the first continuation round. We focus on the first continuation round of trading because it is the last one before the demand shocks begin. Analyzing the previous round (the initial public offering) would be less powerful, because investors know that they still have one round of trading during which to construct their desired portfolios, and might not manage their risk exposure as actively.[6] Analyzing a later round would be problematic because demand shocks would cause prices to vary with the realization of the shocks. Focusing on the first continuation round guarantees that security prices and liquidity are not directly affected by the demand shocks themselves, but only by the expectation of future demand shocks.

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[5] Coller (1996) examines price reactions to uncertain information. Although her study differs significantly from those referenced in this paragraph, it also sheds light on how price responses to information differ from point-prediction responses, as a function of the reliability of the information.

In the first continuation round of trading, an investor's demand schedule can be described as the set of cutoff prices $\{c_{4,3}, c_{3,2}, c_{2,1}, c_{1,0}, c_{0,-1}, c_{-1,-2}, c_{-2,-3}, c_{-3,-4}\}$, where $c_{x,y}$ indicates the price at which the investor switches from preferring a trade of x shares to preferring a trade of y shares. Negative subscripts indicate sales. For example, an investor will buy four shares at prices below $c_{4,3}$, buy three shares in the interval $(c_{4,3}, c_{3,2})$, trade no shares in the interval $(c_{1,0}, c_{0,-1})$, and sell 2 shares in the interval $(c_{-1,-2}, c_{-2,-3})$.[7] We normalize the cutoffs by subtracting the expected value of the security from the cutoff value; thus, negative cutoffs are below expected value and positive cutoffs are above expected value.

We measure the highest price per share at which an investor will buy n shares as the normalized cutoff, $c_{n,n-1}$. That is, $B_{Inv}(n) = c_{n,n-1} - E(d|s)$, where d represents the security's liquidating dividend and s represents the known signals. Similarly, we measure the lowest price per share at which an investor will sell n shares as the normalized cutoff $c_{-n+1,-n}$. That is, $S_{Inv}(n) = c_{-n+1,-n} - E(d|s)$. Finally, we measure the liquidity an investor provides to the market as the signed difference between the investor's $B_{Inv}(n)$ and $S_{Inv}(n)$ measures. That is, $L_{Inv}(n) = B_{Inv}(n) - S_{Inv}(n)$. This difference is always nonpositive (because buy cutoffs are always lower than sell cutoffs), with numbers closer to zero indicating greater liquidity for that security. This difference can also be thought of as a measure of an investor's own bid-ask spread for a depth of n shares.

Panel A of Table 1 reports the cell means of $L_{Inv}(n)$, $B_{Inv}(n)$, and $S_{Inv}(n)$ for $n = 1$ and $n = 3$. Because investors who do not own at least n shares cannot manipulate the $c_{-n+1,-n}$ cutoff, such investor-round observations are omitted from any $S_{Inv}(n)$ or $L_{Inv}(n)$ analyses. As a result, $L_{Inv}(n)$ may not equal $B_{Inv}(n) - S_{Inv}(n)$. As seen in Panel A, investors provide greater amounts of liquidity for one share ($L_{Inv}(1)$) when disclosure quality is high (−44.50) than when disclosure quality is low (−63.79). Potential demand shocks decrease $L_{Inv}(1)$ from −48.96 to −59.33. Furthermore, lower-quality disclosures decrease $L_{Inv}(1)$ more when investors face potential demand shocks (from −45.78 to −72.87) than when they do not (from −43.21 to −54.70).

To assess the statistical significance of these effects, we use a repeated-measures analysis of variance with investor and cohort as repeated factors. This analysis is equivalent to computing the mean level of $L_{Inv}(1)$ for each of the 40 investors in each of the four cells of the design (resulting in a total of 160 means), and then performing a traditional ANOVA on these means.[8] As shown in Panel B of Table 1, lower-quality disclosures have significantly smaller $L_{Inv}(1)$ than higher-quality disclosures by 19.29 francs ($t = 6.52$, $p = 0.000$), while the threat of a future demand shock leads to a marginal decrease in $L_{Inv}(1)$ of 10.37 francs ($t = 1.49$, $p = 0.090$). These two main effects are qualified by a significant interaction

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[6] Results of the IPO rounds are largely similar to the results presented below, except that investors typically buy shares at considerably lower prices. This may reflect the large supply of shares provided to the market during the IPO round, and may also reflect some degree of collusion (investors can win money from the experimenter by buying shares from the experimenter at low prices).

[7] At the endpoints of these intervals, the investor is indifferent between two trades; the computer assigns them the trade that will equate supply and demand in the market.

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[8] The repeated-measures analysis has two advantages. First, it completely accounts for the fact that the multiple observations provided by a single investor are not independent. Second, it allows us to compare the average price by one investor in a given cell with the average price by the same investor in another cell. This increases the power of our tests because it allows us to control for variations in price caused by differences across investors. This analysis is akin to performing a paired t-test on a group of subjects who each give two observations. The distinction is that in our analysis, each subject gives four observations, one in each cell of our design. Using the resulting pooled error term to test our prediction controls for variations caused by differences across investors.

TABLE 1
Effects of Disclosure and Demand Shocks at the Investor Level

Panel A: This panel reports the mean effect of disclosure and demand shocks on investors' willingness to buy or sell n shares. The highest price per share at which an investor will buy n shares, $B_{Inv}(n)$, is measured as the difference between the $c_{n,n-1}$ cutoff of the investor's demand schedule and the security's expected value. The lowest price per share at which an investor will sell n shares, $S_{Inv}(n)$, is measured as the difference between the $c_{-n+1,-n}$ cutoff of the investor's demand schedule and the security's expected value. The liquidity provided by an investor, $L_{Inv}(n)$, is measured as the signed difference between the $B_{Inv}(n)$ and $S_{Inv}(n)$ measures. This difference is always nonpositive, with numbers closer to zero indicating greater liquidity provided by an investor. $L_{Inv}(n)$ can also be thought of as a measure of an individual's own bid-ask spread for a depth of n shares.

	High-Quality Disclosure		*Low-Quality Disclosure*		*Combined*	
No Demand Shocks	$L_{Inv}(1)$:[a]	−43.21	$L_{Inv}(1)$:	−54.70	$L_{Inv}(1)$:	−48.96
	$B_{Inv}(1)$:[b]	−19.56	$B_{Inv}(1)$:	−24.04	$B_{Inv}(1)$:	−21.80
	$S_{Inv}(1)$:[a,b]	21.08	$S_{Inv}(1)$:	27.74	$S_{Inv}(1)$:	24.41
	$L_{Inv}(3)$:	−65.60	$L_{Inv}(3)$:	−96.91	$L_{Inv}(3)$:	−81.06
	$B_{Inv}(3)$:	−30.46	$B_{Inv}(3)$:	−46.38	$B_{Inv}(3)$:	−38.42
	$S_{Inv}(3)$:	32.53	$S_{Inv}(3)$:	48.44	$S_{Inv}(3)$:	40.38
Demand Shocks	$L_{Inv}(1)$:	−45.78	$L_{Inv}(1)$:	−72.87	$L_{Inv}(1)$:	−59.33
	$B_{Inv}(1)$:	−22.24	$B_{Inv}(1)$:	−40.17	$B_{Inv}(1)$:	−31.20
	$S_{Inv}(1)$:	22.71	$S_{Inv}(1)$:	30.90	$S_{Inv}(1)$:	26.81
	$L_{Inv}(3)$:	−80.81	$L_{Inv}(3)$:	−140.94	$L_{Inv}(3)$:	−110.50
	$B_{Inv}(3)$:	−38.99	$B_{Inv}(3)$:	−73.23	$B_{Inv}(3)$:	−56.11
	$S_{Inv}(3)$:	39.20	$S_{Inv}(3)$:	63.74	$S_{Inv}(3)$:	51.31
Combined	$L_{Inv}(1)$:	−44.50	$L_{Inv}(1)$:	−63.79	$L_{Inv}(1)$:	−54.14
	$B_{Inv}(1)$:	−20.90	$B_{Inv}(1)$:	−32.11	$B_{Inv}(1)$:	−26.50
	$S_{Inv}(1)$:	21.90	$S_{Inv}(1)$:	29.32	$S_{Inv}(1)$:	25.61
	$L_{Inv}(3)$:	−73.21	$L_{Inv}(3)$:	−118.92	$L_{Inv}(3)$:	−95.78
	$B_{Inv}(3)$:	−34.73	$B_{Inv}(3)$:	−59.81	$B_{Inv}(3)$:	−47.27
	$S_{Inv}(3)$:	35.86	$S_{Inv}(3)$:	56.09	$S_{Inv}(3)$:	45.85

(Continued on next page)

TABLE 1 (Continued)

Panel B: This panel reports the main effects and interactions of our dependent variables, along with their respective significance levels. All analyses are based on repeated measures ANOVAs that treat each investor as providing one independent observation. Planned contrasts for disclosure are calculated by subtracting the low-quality-disclosure marginal effect from the high-quality-disclosure marginal effect. Planned contrasts for demand shocks are calculated by subtracting the demand-shock marginal effect from the no-demand-shock marginal effect. Finally, planned interaction contrasts are calculated by subtracting the effect of disclosure in the no-demand-shock setting from the effect of disclosure in the demand-shock setting. Thus, positive numbers indicate support for our hypotheses. t-statistics are reported in parentheses.

Dependent Variable	*Disclosure Effect*	*Demand Shock Effect*	*Interaction*
$L_{Inv}(1)$	19.29 (6.52)***	10.37 (1.49)*	15.60 (2.31)**
$B_{Inv}(1)$	11.21 (4.52)***	9.40 (1.43)*	13.45 (3.85)***
$S_{Inv}(1)$	−7.42 (−4.95)†	−2.40 (−0.37)	−1.53 (−0.20)
$L_{Inv}(3)$	45.71 (8.37)***	29.43 (5.23)***	28.82 (4.61)***
$B_{Inv}(3)$	25.08 (8.58)***	17.69 (2.53)**	18.32 (5.00)***
$S_{Inv}(3)$	−20.23 (−4.26)†	−10.93 (−2.39)†	−8.63 (−1.00)

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*, **, *** indicate significance at the 0.1, 0.05, and 0.01 level, one-sided, respectively.

† These results are in the opposite direction of our prediction, making one-sided p-values inappropriate. The two-sided p-values for these results are all significant at the 0.05 level.

[a] The averages for the $S_{Inv}(n)$ and $L_{Inv}(n)$ measures omit those observations in which investors owned fewer than n shares because these investors could not manipulate the $c_{-n+1,-n}$ cutoff. This explains why the average $L_{Inv}(n)$ measures above are not equal to the average $B_{Inv}(n)$ measure minus the average $S_{Inv}(n)$ measure.

[b] All prices are significantly different from zero at the 0.01 level, two-sided.

wherein the effect of disclosure on $L_{Inv}(1)$ is 15.60 francs larger when investors face potential demand shocks than when they do not ($t = 2.31$, $p = 0.027$). Thus, the analyses of the liquidity provided by investors for a trade of one share strongly support our predictions of the main effects and their interaction. Our results are stronger when we examine liquidity at a depth of three shares ($L_{Inv}(3)$): the effect of demand shocks and its interaction with disclosure are both significant at the $p < 0.01$ level.

A similar analysis on investors' willingness to buy one share ($B_{Inv}(1)$) reveals that lower-quality disclosures produce bid prices that are 11.21 francs smaller than for higher-quality disclosures ($t = 4.52$, $p = 0.001$).[9] Potential demand shocks lead to marginally smaller $B_{Inv}(1)$ by 9.40 francs ($t = 1.43$, $p = 0.098$). Both of these effects are again qualified by a significant interaction wherein the effect of disclosure on $B_{Inv}(1)$ is 13.45 francs larger when investors face demand shocks than when they do not ($t = 3.85$, $p = 0.003$). Thus, the analyses of investors' willingness to buy one share also support our predictions of the main effects and their interaction. Increasing the depth level to three shares makes the demand shock effect significant at the $p < 0.05$ level, but otherwise does not change the results.

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[9] We report the prices in francs rather than in percentages because investors are compensated on the basis of returns in francs. Price as a percentage of security value would change if a constant term were added to the value of each security. However, adding such a constant would not alter either the mean or variance of investors' trading gains.

Somewhat surprisingly, we find that the prices at which investors will sell one share ($S_{Inv}(1)$) behave quite differently from bidding prices. First, we observe a disclosure effect wherein lower-quality disclosures actually lead to higher $S_{Inv}(1)$ from 21.90 to 29.32 ($t = -4.95$, two-sided $p = 0.002$). Neither demand shocks ($t = -0.37$, n.s.) nor demand shocks interacting with disclosure quality ($t = -0.20$, n.s.) influence $S_{Inv}(1)$. Tests at a depth of three shares reveal a significant effect of demand shocks ($p = 0.024$), but still do not reveal a significant interaction.

Traditional economic theory provides little insight into why disclosure might have different effects on bid and ask prices. If investors are risk-averse expected-utility maximizers, they should bid and ask less than expected value. As they face more risk, or become more risk averse, these prices should drop, with the bid dropping slightly faster than the ask. Thus, traditional economic theory would predict that bids and asks should behave similarly.

One explanation for this difference may lie in another surprising result—the average asking price for one share is 25.61 francs greater than expected value ($t = 10.40$, $p = 0.001$). This is inconsistent with traditional economic theory because investors who require a premium to compensate them for the risk of buying a risky share should be willing to pay a premium (i.e., accept a lower price) in order to have that risk taken from them. However, our finding is consistent with a large literature in psychology that demonstrates an endowment effect in which the price people demand to sell an asset they already own is significantly higher than the price people are willing to pay to acquire the same asset. These papers often show the largest effects in risky settings (Kahneman et al. 1990; see also Kachelmeier and Shehata 1992, groups 7 and 8; Odean 1998; Weber and Camerer 1998).[10]

Another reason asks may behave differently from bids is that risk aversion (in the classical sense) and endowment effects pull asks in different directions—risk aversion pulls them downward, while the endowment effect pulls them upward. In contrast, risk aversion and endowment effects both pull bids downward. If different participants respond to endowment effects in different magnitudes, asks simply may be too noisy to respond systematically to differences in disclosure quality.

Market Behavior

We next investigate the effects of our treatment variables on market prices and liquidity. Combining the eight cutoff prices from each of the five investors yields a net demand schedule with 40 cutoffs that can be described as the set $\{m_{40,39}, m_{39,38}, \ldots, m_{-38,-39}, m_{-39,-40}\}$, where $m_{x,y}$ indicates the price at which the market's net demand/supply switches from x shares to y, with negative numbers indicating net supply. We measure the highest price per share at which the market will demand an additional n shares as the normalized cutoff, $m_{n,n-1}$. That is, $B_{Mkt}(n) = m_{n,n-1} - E(d|s)$, where d represents the security's liquidating dividend and s represents the known signals.[11] Similarly, we measure the lowest price per share at which the market will supply an additional n shares as the normalized cutoff $m_{-n+1,-n}$. That is, $S_{Mkt}(n) = m_{-n+1,-n} - E(d|s)$. Finally, we measure the liquidity of the market as the signed difference between the market's $B_{Mkt}(n)$ and $S_{Mkt}(n)$ measures. That is, $L_{Mkt}(n) = B_{Mkt}(n) - S_{Mkt}(n)$. This difference is always nonpositive, with numbers closer to zero indicating greater liquidity for that security. This difference can also be thought of as a measure of the market's bid-ask spread for a depth of n shares.

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[10] Our result is somewhat unusual in that our subjects exhibit an endowment effect even though they are trading goods that have no consumption value, nor even a physical presence (they are intangible assets shown only on their computer screens). Kahneman et al. (1990) show that endowment effects are typically small for such items, compared to physical items with consumption value, such as pens or coffee mugs.

Panel A of Table 2 reports the cell means of $L_{Mkt}(n)$, $B_{Mkt}(n)$, and $S_{Mkt}(n)$ for $n = 1$, $n = 5$, and $n = 10$. Panel B reports t-statistics computed using a repeated-measures analysis with cohort as the repeated factor. The table shows that the effects of disclosure quality and demand shocks on market liquidity are increasing in depth. At a depth of only one share, lower-quality disclosures lead to smaller liquidity ($L_{Mkt}(1)$) by 1.97 francs ($t = 7.02$, $p = 0.000$). Potential demand shocks lead to smaller $L_{Mkt}(1)$ by 3.39 francs ($t = 3.00$, $p = 0.010$). Both of these effects are qualified by a significant interaction wherein the difference in $L_{Mkt}(1)$ due to disclosure quality is 1.76 francs larger when investors face demand shocks ($t = 2.01$, $p = 0.042$). Similar and increasingly stronger results are obtained when we consider greater levels of depth. Thus, the analyses of market liquidity support our predictions of the main effects and their interaction.

A similar analysis on market bids shows that the effects of disclosure and demand shocks also depend on the level of depth. At a depth of one share, market bids ($B_{Mkt}(1)$) are affected only by disclosure, with lower-quality disclosures leading to lower bids ($t = 2.11$, $p = 0.037$). $B_{Mkt}(1)$ is not affected by either demand shocks ($t = 0.97$, n.s.) or by the interaction of disclosure and demand shocks ($t = 1.13$, n.s.). However, at a depth of five shares (or more), disclosure quality ($t = 3.08$, $p = 0.009$) and demand shocks ($t = 2.50$, $p = 0.021$) as well as their interaction ($t = 2.55$, $p = 0.019$) significantly influence bids ($B_{Mkt}(5)$) in the predicted manner. As shown in Panel A of Figure 4, the size of both main effects and the interaction effect on $B_{Mkt}(n)$ increase monotonically with depth.

Analysis of market asking prices again reveals a surprising pattern, somewhat analogous to the individual level results. At a depth of one share, asking prices ($S_{Mkt}(1)$) are not influenced by disclosure quality ($t = 1.28$, n.s.), demand shocks ($t = -0.04$, n.s.), or their interaction ($t = 0.68$, n.s.). As depth increases, only the effect of disclosure quality ever becomes significant, but it does so in the opposite direction of our predictions. Beginning at a depth of five shares, lower-quality disclosure leads to a significantly larger asking price ($t = -4.72$, two-sided $p = 0.002$). Neither demand shocks nor the interaction of demand shocks and disclosure quality ever become significant. Panel B of Figure 4 depicts the size of both main effects and the interaction effect on $S_{Mkt}(n)$.

Two forces seem likely to cause the effects of disclosure and demand shocks to be greater at greater depths. First, risk effects become more important (relative to any other forces acting upon investors) as investors are forced to take larger trading positions. Second, at greater depths, disclosure effects are determined by the demand schedules of more investors. At a depth of only one share, an investor trying to sell need only offer enough to induce the *least* risk-averse investor to buy one share. Because disclosure should have only slight effects on the behavior of an investor who is scarcely risk averse, this investor's cutoff will not be dramatically affected by the disclosure manipulation. As the investor attempts to sell more shares, he must induce increasingly risk-averse investors to buy shares. This should increase the size of the disclosure effects.

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[11] An alternative measurement for this variable would be the average of the normalized cutoffs from $m_{1,0}$ to $m_{n,n-1}$. Results using this measure are similar to those reported here. We use the above measure because it better approximates the way investors were asked to think about the demand schedule.

TABLE 2
Effects of Disclosure and Demand Shocks at the Market Level

Panel A: This panel reports the mean effects of disclosure and demand shocks on market prices and liquidity. The highest (lowest) price per share at which the market will buy (sell) n additional shares, $B_{Mkt}(n)$ $(S_{Mkt}(n))$, *is measured as the difference between the* $m_{n,n-1}$ $(m_{-n+1,-n})$ *cutoff of the aggregate demand schedule and the security's expected value. The market's liquidity,* $L_{Mkt}(n)$, *is measured as the signed difference between the* $B_{Mkt}(n)$ *and* $S_{Mkt}(n)$ *measures. This difference is always nonpositive, with numbers closer to zero indicating greater liquidity provided by all investors.* $L_{Mkt}(n)$ *can be thought of as a measure of the bid-ask spread for a depth of n shares.*

	High-Quality Disclosure		*Low-Quality Disclosure*		*Combined*	
No Demand Shocks	$L_{Mkt}(1)$:	−1.14	$L_{Mkt}(1)$:	−2.23	$L_{Mkt}(1)$:	−1.69
	$B_{Mkt}(1)$:	0.18	$B_{Mkt}(1)$:	−2.05	$B_{Mkt}(1)$:	−0.94
	$S_{Mkt}(1)$:	1.32	$S_{Mkt}(1)$:	0.18	$S_{Mkt}(1)$:	0.75
	$L_{Mkt}(5)$:	−7.23	$L_{Mkt}(5)$:	−17.07	$L_{Mkt}(5)$:	−12.15
	$B_{Mkt}(5)$:	−2.46	$B_{Mkt}(5)$:	-6.94^{a}	$B_{Mkt}(5)$:	-4.70^{a}
	$S_{Mkt}(5)$:	4.78^{a}	$S_{Mkt}(5)$:	10.13^{a}	$S_{Mkt}(5)$:	7.46^{a}
	$L_{Mkt}(10)$:	−36.26	$L_{Mkt}(10)$:	−76.88	$L_{Mkt}(10)$:	−56.57
	$B_{Mkt}(10)$:	-8.68^{a}	$B_{Mkt}(10)$:	-19.73^{a}	$B_{Mkt}(10)$:	-14.21^{a}
	$S_{Mkt}(10)$:	27.58^{a}	$S_{Mkt}(10)$:	57.15^{a}	$S_{Mkt}(10)$:	42.37^{a}
Demand Shocks	$L_{Mkt}(1)$:	−3.66	$L_{Mkt}(1)$:	−6.51	$L_{Mkt}(1)$:	−5.08
	$B_{Mkt}(1)$:	−0.97	$B_{Mkt}(1)$:	−7.35	$B_{Mkt}(1)$:	−4.16
	$S_{Mkt}(1)$:	2.69	$S_{Mkt}(1)$:	−0.84	$S_{Mkt}(1)$:	0.92
	$L_{Mkt}(5)$:	−19.17	$L_{Mkt}(5)$:	−41.37	$L_{Mkt}(5)$:	−30.27
	$B_{Mkt}(5)$:	−6.93	$B_{Mkt}(5)$:	-22.46^{a}	$B_{Mkt}(5)$:	-14.69^{a}
	$S_{Mkt}(5)$:	12.24^{a}	$S_{Mkt}(5)$:	18.91^{a}	$S_{Mkt}(5)$:	15.58^{a}
	$L_{Mkt}(10)$:	−54.20	$L_{Mkt}(10)$:	−109.28	$L_{Mkt}(10)$:	−81.74
	$B_{Mkt}(10)$:	-16.31^{a}	$B_{Mkt}(10)$:	-51.27^{a}	$B_{Mkt}(10)$:	-33.79^{a}
	$S_{Mkt}(10)$:	37.89^{a}	$S_{Mkt}(10)$:	58.01^{a}	$S_{Mkt}(10)$:	47.95^{a}
Combined	$L_{Mkt}(1)$:	−2.40	$L_{Mkt}(1)$:	−4.37	$L_{Mkt}(1)$:	−3.38
	$B_{Mkt}(1)$:	−0.40	$B_{Mkt}(1)$:	−4.70	$B_{Mkt}(1)$:	−2.54
	$S_{Mkt}(1)$:	2.01	$S_{Mkt}(1)$:	−0.33	$S_{Mkt}(1)$:	0.84
	$L_{Mkt}(5)$:	−13.20	$L_{Mkt}(5)$:	−29.22	$L_{Mkt}(5)$:	−21.21
	$B_{Mkt}(5)$:	-4.70^{a}	$B_{Mkt}(5)$:	-14.70^{a}	$B_{Mkt}(5)$:	-9.70^{a}
	$S_{Mkt}(5)$:	8.51^{a}	$S_{Mkt}(5)$:	14.52^{a}	$S_{Mkt}(5)$:	11.52^{a}
	$L_{Mkt}(10)$:	−45.23	$L_{Mkt}(10)$:	−93.08	$L_{Mkt}(10)$:	−69.16
	$B_{Mkt}(10)$:	-12.49^{a}	$B_{Mkt}(10)$:	-35.50^{a}	$B_{Mkt}(10)$:	-24.00^{a}
	$S_{Mkt}(10)$:	32.74^{a}	$S_{Mkt}(10)$:	57.58^{a}	$S_{Mkt}(10)$:	45.16^{a}

(*Continued on next page*)

TABLE 2 (Continued)

Panel B: This panel reports the main effects and interactions of our dependent variables, along with their respective significance levels. All analyses are based on repeated measures ANOVAs that treat each cohort as providing one independent observation. Planned contrasts for disclosure are calculated by subtracting the low-quality-disclosure marginal effect from the high-quality-disclosure marginal effect. Planned contrasts for demand shocks are calculated by subtracting the demand-shock marginal effect from the no-demand-shock marginal effect. Finally, planned interaction contrasts are calculated by subtracting the effect of disclosure in the no-demand-shock setting from the effect of disclosure in the demand-shock setting. Thus, positive numbers indicate support for our hypotheses. t-statistics are reported in parentheses.

Dependent Variable	*Disclosure Effect*	*Demand Shock Effect*	*Interaction*
$L_{Mkt}(1)$	1.97	3.39	1.76
	(7.02)***	(3.00)***	(2.01)**
$B_{Mkt}(1)$	4.30	3.22	4.15
	(2.11)**	(0.97)	(1.13)
$S_{Mkt}(1)$	2.34	−0.17	2.39
	(1.28)	(−0.04)	(0.68)
$L_{Mkt}(5)$	16.02	18.12	12.36
	(4.72)***	(4.55)***	(5.92)***
$B_{Mkt}(5)$	10.00	9.99	11.05
	(3.08)***	(2.50)**	(2.55)**
$S_{Mkt}(5)$	−6.01	−8.12	−1.32
	(−4.72)†	−(1.27)	(−0.30)
$L_{Mkt}(10)$	47.85	25.17	14.46
	(4.35)***	(2.09)**	(2.28)**
$B_{Mkt}(10)$	23.01	19.58	23.91
	(4.21)***	(3.86)***	(4.97)***
$S_{Mkt}(10)$	−24.84	−5.58	9.45
	(−3.38)†	(−0.41)	(1.09)

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*, **, *** indicate significance at the 0.1, 0.05, and 0.01 level, one-sided, respectively.

† These results are in the opposite direction of our prediction, making one-sided p-values inappropriate. The two-sided p-values for these results are all significant at the 0.05 level.

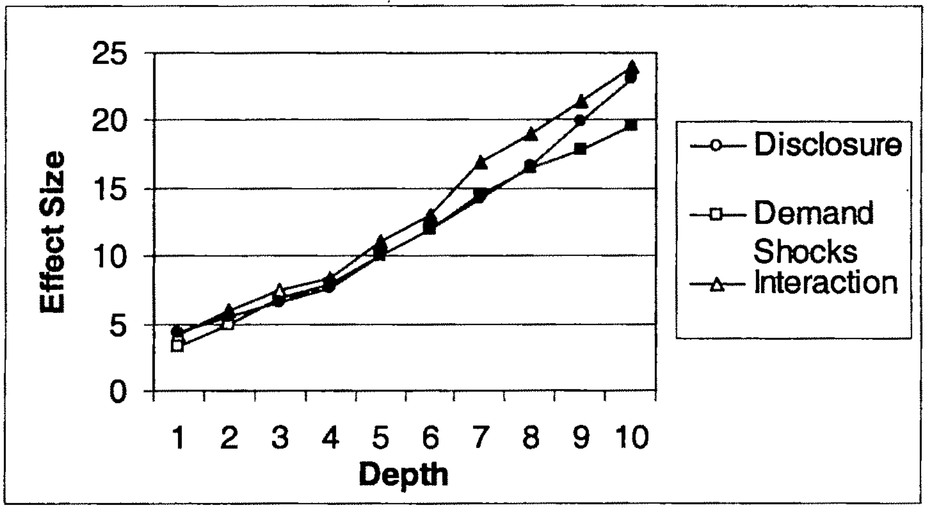
[a] Prices are statistically different from zero at the 0.05 level, two-sided.

A similar phenomenon appears to drive away the endowment effect at the market level. An investor who wishes to buy a single share must pay only enough to buy from the investor least susceptible to the endowment effect. Table 2 shows that market asks at a depth of one share ($S_{Mkt}(1)$) are not significantly greater than expected value, indicating that this marginal investor is not susceptible to the endowment effect. As investors attempt to buy more shares, they must entice additional investors who seem to be increasingly susceptible to the endowment effect. In the extreme, an additional investor attempting to buy 10 shares would have to buy an average of 2 shares from each of the 5 investors,

FIGURE 4
Effects of Disclosure and Demand Shocks on Market Prices at Varying Levels of Depth

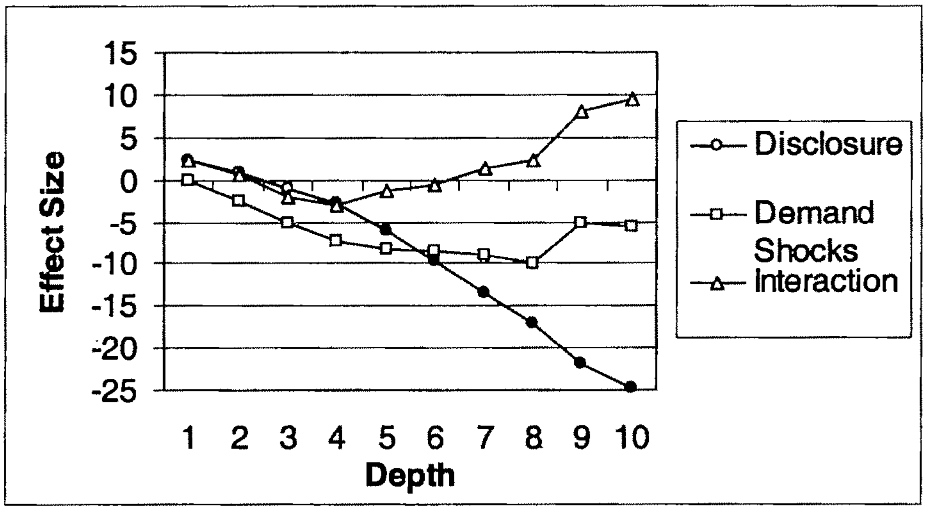
Panel A: Market Bids ($B_{Inv}(n)$)

This panel displays the effects of disclosure and demand shocks on market bids at varying levels of depth. Darkened data points represent significant effects.



Panel B: Market Asks ($S_{Inv}(n)$)

This panel displays the effects of disclosure and demand shocks on market asking prices at varying levels of depth. Darkened data points represent significant effects.



causing them to face an endowment effect essentially identical to that shown at the individual level.[12] The elimination of the endowment effect at shallow depths is similar to the results of Kachelmeier (1996), and confirms the importance of depth in understanding market behavior. We discuss this issue further in the following section.

IV. ADDITIONAL ANALYSES

The Indirect Effect of Disclosure

We interpret the interaction between disclosure and demand shocks as evidence that investors care more about liquidity when they face potential demand shocks. To test this interpretation, we regress the prices at which investors will buy ($B_{Inv}(1)$) or sell ($S_{Inv}(1)$) one share in the first continuation round onto market liquidity ($L_{Mkt}(1)$) observed in the IPO round. We fit this regression separately for each cell of our design to test whether liquidity is priced irrespective of our manipulations. As shown in Table 3, the relationship between market liquidity in the IPO round and the prices at which investors will trade in

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[12] The effect at the market level is not quite the same as at the individual level, because one investor's ask cutoffs could be below another investor's bid cutoffs, resulting in a slightly different price.

TABLE 3
The Effect of Market Liquidity on Willingness to Trade

This table reports OLS estimation of the extent to which investors' willingness to buy or sell in the first continuation round is determined by levels of market liquidity in the IPO round. Willingness to *buy* one share is measured as the difference between the $c_{1,0}$ cutoff of the investor's demand schedule and the security's expected value ($B_{Inv}(1)$). Willingness to *sell* one share is measured as the difference between the $c_{0,-1}$ cutoff of the investor's demand schedule and the security's expected value ($S_{Inv}(1)$). Market liquidity is measured as the signed difference between the $m_{1,0}$ and $m_{0,-1}$ cutoffs of the market demand schedule ($L_{Mkt}(1)$) during the IPO round. Standardized coefficient estimates are reported for the four different cells of our experiment: (1) High-quality disclosure—No demand shocks, (2) High-quality disclosure—Demand shocks, (3) Low-quality disclosure—No demand shocks, and (4) Low-quality disclosure—Demand shocks.

$$\text{Model 1: } (B_{Inv}(1))_j = \alpha + \beta(L_{Mkt}(1)) + \varepsilon_j$$
$$\text{Model 2: } (S_{Inv}(1))_j = \alpha + \beta(L_{Mkt}(1)) + \varepsilon_j$$

Setting	$\beta_{Model\ 1}$ *(t-statistic)*	$\beta_{Model\ 2}$ *(t-statistic)*
High-Quality Disclosure—No Demand Shocks	0.08 (0.46)	0.20 (1.26)
High-Quality Disclosure—Demand Shocks	0.22 (1.39)*	0.10 (0.63)
Low-Quality Disclosure—No Demand Shocks	0.25 (1.62)*	0.19 (1.21)
Low-Quality Disclosure—Demand Shocks	0.29 (1.87)**	0.29 (1.84)**

*, ** indicate significance at the 0.10, 0.05 level, one-tailed, respectively.
n = 40 in each setting.

the first continuation round is significantly positive at the $p = 0.05$ level only when disclosure quality is low and investors face potential demand shocks. This result is consistent with our interpretation that investors care more about liquidity when they face demand shocks, and suggests a plausible reason why disclosure may have greater effects on price when investors face demand shocks.

If investors who face demand shocks prefer liquid securities because they incur lower transaction costs when they are forced to sell them, we should observe these investors trading higher-disclosure securities when they are forced to trade. We test this conjecture by looking at responses to forced sales for all security pairs in which one security is of low disclosure and the other is of high disclosure. Across both sessions, investors faced 123 forced-sale decisions. For each decision, we calculate the number of high-disclosure securities sold minus the number of low-disclosure securities sold. We then regress this difference onto (1) an intercept term and (2) the proportion of high-disclosure shares in the investors' portfolio (to control for the fact that investors can only sell shares they own). We find a t-statistic on the intercept of 1.13 ($p < 0.13$, one-tailed), indicating that investors prefer to sell the high-disclosure securities, after controlling for the composition of their portfolios. However, the result fails to achieve conventional significance levels. An analysis of forced buying also fails to achieve a significant result. Our design may simply lack the power to observe such effects.

An Alternative Explanation

We believe that our treatment effects reflect investors' risk-avoidance behavior. One alternative hypothesis is that prices and liquidity simply reflect artifacts of the software interface. In particular, participants could simply click the "constrain" button (which shifts all cutoffs into the range of possible values given the number of signals) and the "linear" button (which shifts the cutoffs so as to form a straight line between the highest and lowest cutoffs). Such behavior would lead to our main effect of disclosure on liquidity and prices—bids would be lower and asks would be higher. We do not believe that such an artifact could account for the complete pattern of results presented in this paper, primarily because the demand shock treatment does not alter the interface. The interface could therefore cause neither a main effect of demand shock nor an interaction between disclosure and demand shock.

Nevertheless, we conduct a variety of analyses to test directly the extent to which investors rely on these interface controls. In one analysis, we assess the extent to which investors seem to click the "constrain" button with no subsequent alteration of cutoffs. To do this, we calculate the percentage of observations in which both the extreme buy and sell cutoffs of an investor's demand schedule fall within one (five) franc(s) of the lowest and highest possible values, respectively, given the number of known signals. Based on this calculation, we find that only 6.3 percent (8.4 percent) of demand schedules are consistent with the investor clicking the "constrain" button and not subsequently altering the outside cutoffs. Furthermore, when these observations are dropped from the investor-level analyses, our inferences from the results are unchanged.[13]

In another set of analyses, we assess the extent to which investors seem to click the "linear" button with no subsequent alteration of cutoffs. To do this, we first calculate the difference between the highest sell cutoff that the investor can manipulate and the lowest buy cutoff. This difference is then divided by the total number of cutoffs the investor can manipulate minus one. This quotient represents the distance that would exist between each cutoff if the investor had clicked the "linear" button. Next, we calculate for each demand schedule the percentage of interior cutoffs (i.e., those cutoffs which lie between the two cutoffs used to calculate the initial difference) that fall within one (five) franc(s) of their respective "expected" values. Based on this calculation, we find that 16.9 percent (31.1 percent) of demand schedules are consistent with the investor clicking the "linear" button and not subsequently altering the interior cutoffs. That is, 16.9 percent (31.1 percent) of the schedules have *all* interior cutoffs within one (five) franc(s) of the value they should have if the investor clicked the "linear" button. When these observations are dropped from the investor-level analyses, our inferences from the results are unchanged.[14]

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[13] Table 1 shows that the average prices at which investors buy or sell three shares in the high-disclosure setting actually lie outside the range of possible security values. This suggests that our disclosure effects are not driven simply by investors' insistence that their cutoffs lie within the range of feasible values (a "ceiling" effect).

Although we do recognize the potential demand effects our interface may have presented, the above analyses suggest that our results are not simply driven by the interface. We further note that our results are observed primarily in the buy prices but not the sell prices. If the interface did account for our results, we would expect both sets of cutoffs to be equally affected. Again, this observation suggests that interface design alone does not generate the pattern of results we see.

Risk-Avoidance Behavior

To provide additional support for our interpretations of treatment effects as responses to risk, we conduct a variety of supplemental analyses that test for other patterns of behavior that would reflect responses to risk. To the extent that these analyses show risk-avoidance behavior, it seems more likely that the treatment effects reflect similar types of behavior, rather than simply artifacts of the interface design.

For our first analysis, we examine how inventory levels alter the prices investors pay for securities. Assuming rational inventory management, the marginal value of an additional share decreases as the number of shares accumulated increases. Consistent with previous experimental work (Bloomfield 1996b), Table 4 reports that the price investors will pay to buy an additional share in the first continuation round decreases as their holdings in that security increase ($p < 0.01$ for each cell). The price investors ask to sell a share in the first continuation round is negatively related to holdings only in the low-quality-disclosure, no demand-shocks cell of our design ($t = -3.12$, $p = 0.017$). A regression including dummy variables and interactions for our independent variables and inventory holdings (not shown) shows further that the price-holdings relationship is more negative when investors receive low-quality disclosures ($t = -5.32$, $p < 0.01$). This suggests that investors are manipulating the prices they are willing to pay in order to reduce their exposure to risk, further strengthening the case that the prices do in fact reflect responses to risk.

We also examine whether investors reduce their risk by not holding too many or too few shares of either security, relative to the average number of shares available. Given that there is a total of 20 shares of each security for 5 investors, investors can minimize their transaction costs by holding 4 shares of each security. Holding too many shares increases the transactions costs associated with forced purchases, because it is likely to be more expensive to buy shares when fewer are available. Holding too few shares of one security increases the costs of forced sales of the other security, because it is likely to be more

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[14] Additional tests reveal that the percentage of interior cutoffs that fall within one or five francs of the linear path is positively correlated with investor liquidity at a depth of three shares ($r = 0.39$, $t = 2.64$, $p = 0.01$). This probably results from a mechanical relationship: as the outside cutoffs become closer together, the interior cutoffs tend to move closer to a linear approximation.

TABLE 4
The Effect of Inventory Balances on Willingness to Trade

This table reports OLS estimation of the relationship between inventory levels and changes in investors' willingness to buy or sell one additional share. The change in investors' willingness to buy an additional share is measured as the signed difference between $B_{Inv}(1)$ in the first continuation round and $B_{Inv}(1)$ in the IPO round. Similarly, the change in investors' willingness to sell an additional share is measured as the signed difference between $S_{Inv}(1)$ in the first continuation round and $S_{Inv}(1)$ in the IPO round. The following regressions estimate the extent to which changes in willingness to buy or sell are determined by levels of inventory obtained during the IPO round. Standardized coefficient estimates are reported for the four different cells of our experiment: (1) High-quality disclosure—No demand shocks, (2) High-quality disclosure—Demand shocks, (3) Low-quality disclosure—No demand shocks, and (4) Low-quality disclosure—Demand shocks.

$$\text{Model 1: } \Delta Buy1_j = \alpha + \beta(Holding) + \varepsilon_j$$
$$\text{Model 2: } \Delta Sell1_j = \alpha + \beta(Holding) + \varepsilon_j$$

Setting	$\beta_{Model\ 1}$ *(t-statistic)*	$\beta_{Model\ 2}$ *(t-statistic)*
High-Quality Disclosure—No Demand Shocks	−0.37 (−2.48)**	−0.15 (−0.96)
High-Quality Disclosure—Demand Shocks	−0.27 (−1.75)*	0.06 (0.35)
Low-Quality Disclosure—No Demand Shocks	−0.52 (−3.79)**	−0.45 (−3.12)**
Low-Quality Disclosure—Demand Shocks	−0.49 (−3.48)**	0.04 (0.27)

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*, ** indicate significance at the 0.05, 0.01 level, one-tailed, respectively.
n = 40 in each setting.

expensive to sell many shares in one security than to sell only a couple shares in each of two securities. We compute for each investor the average deviation of that investor's holdings from the average of 4 shares at the conclusion of the IPO and the first continuation rounds. We find that these deviations are significantly smaller for securities with low-quality disclosures ($p < 0.05$) and when investors face potential demand shocks ($p < 0.01$). Thus, the data suggest that investors respond to greater risk by not holding either too many or too few shares of each security.

Despite such support for risk-avoidance behavior, it is important to note that the behavior of asking prices is inconsistent with risk-avoidance behavior. Why investors demand higher prices to sell securities with more uncertain payoffs is a topic worthy of future consideration.

Variability in Market Prices

As a final analysis, we examine the variability in market prices both within and between cohorts. Rational expectations models typically predict a unique price given a set of risk preferences. Therefore, we anticipated no differences in the variability of market prices as a result of our treatments. However, we find considerable variability in market prices both within and between cohorts.

Variation in prices across cohorts can arise from variations in risk preferences across different sets of investors. To analyze this possibility, we measure between-cohort variation by computing the mean market price (relative to expected value) for each cohort in each cell of the design and then the standard deviation across the eight cohort means in each cell. As reported in Table 5, between-cohort variation in prices is greater for the two cells with low disclosure (6.96 and 14.11) than for the two cells with high disclosure (2.74 and 5.22). Similarly, between-cohort variation is greater for the two cells with demand shocks (5.22 and 14.11) than for the two cells without demand shocks (2.74 and 6.96). These increases in variation presumably reflect the importance of differences in risk preferences from one cohort to another when investors face greater risk. While experience reduces overall variability, the differences in variability are clearly present. Thus, the differences in between-cohort variability across disclosure and demand shocks do not appear to be driven by inexperience.

Variation in prices can also arise within each cohort from changes in risk preferences over time, from changes in risk-management strategies over time, or from changing beliefs about other investors' strategies. To measure within-cohort variation caused by these factors, we first compute average prices in the first continuation round for each security in each cell. We then compute the standard deviation of these averages for each cohort within each of the four combinations of disclosure and demand shock. We then average these standard deviations over the eight cohorts. As seen in Table 5, within-cohort variability in prices is greater for the two cells with low-quality disclosures (8.12 and 7.50) than for the two cells with high disclosure (3.07 and 4.09). However, within-cohort variation is similar across the two cells with demand shocks (4.09 and 7.50) and the two cells without demand shocks (3.07 and 8.12).

V. CONCLUSION

This study uses a laboratory experiment to examine how individual investors and aggregate market behavior respond to changes in disclosure quality and investors' exposure to demand shocks. Our data show that disclosure has a direct effect on prices, because investors who face less payoff uncertainty are willing to buy at higher prices. Disclosure has a direct effect on liquidity because it induces investors to sell at lower prices and buy at higher prices. Disclosure also has an indirect effect on prices when investors are subject to demand shocks. When demand shocks are possible, investors pay more for high-disclosure securities because the greater liquidity of these securities decreases the amount of pressure investors exert on prices if they are forced to sell. This indirect effect causes disclosure to increase prices and liquidity more when investors face demand shocks than when they do not. The totality of our results suggests that regulations mandating higher-quality disclosures are likely to increase prices and liquidity of affected securities.

Disclosure affects market prices more strongly when we examine greater depths (i.e., when we examine how it affects the prices and liquidity of larger transactions). This suggests that a significant portion of disclosure effects in real markets may not be revealed by bids and asks quoted for small transactions. Thus, our results strongly echo the cautions of Callahan et al. (1997, 57–58) and Grossman and Miller (1988, 628) about focusing excessively on bid-ask spreads. Future empirical research on disclosure might attempt to focus on depth, as well as quoted spreads (Lee et al. 1993).

We also find some evidence at the individual level that is difficult to interpret. In particular, investors' asking prices lie well above expected value, as if investors are demanding a premium to have risk taken from them. Because these investors also engage in a variety of risk-reducing actions, such as paying low prices for risky securities, doing so more when they hold large inventories, and balancing their portfolios, it seems unlikely

TABLE 5
Price Variance between and within Cohorts

This table reports means and standard deviations between cohorts, as well as the average within-cohort standard deviations, for *prices* defined here as the difference between the first continuation round market price and the security's expected value. The standard deviation *between* cohorts is computed as the standard deviation of the cohort means in each cell of our design. The average *within*-cohort standard deviation is computed as the average of the eight cohort standard deviations in each cell of our design. Means are reported by session, by cohort, and altogether, with standard deviations in parentheses. S1 and S2 indicate the session in which a cohort traded in that particular cell of the design.

			High-Quality Disclosure			*Low-Quality Disclosure*	
No Demand Shocks	*Overall*						
			0.75 (2.74)			−0.93 (6.96)	
	Sessions						
		1:	1.77 (3.56)		1:	−1.09 (10.37)	
		2:	−0.28 (1.46)		2:	−0.76 (2.33)	
	Cohorts						
		1:	2.50 (3.23)	Avg. Std. Dev. 3.07	1:	1.03 (2.20)	Avg. Std. Dev. 8.12
		2:	6.50 (1.90)		2:	12.72 (7.34)	
	S1	3:	−1.22 (7.94)		3:	−9.50 (28.00)	
		4:	−0.69 (4.45)		4:	−8.61 (11.46)	
		5:	−2.40 (2.37)		5:	−2.82 (3.02)	
		6:	0.18 (2.22)		6:	−2.76 (8.83)	
	S2	7:	0.16 (1.76)		7:	1.30 (1.94)	
		8:	0.94 (0.71)		8:	1.18 (2.19)	

(*Continued on next page*)

TABLE 5 (Continued)

		High-Quality Disclosure			*Low-Quality Disclosure*	
Demand Shocks	*Overall*			*Overall*		
		0.86 (5.22)			−4.09 (14.11)	
	Sessions			*Sessions*		
		1: −1.60 (4.75)			1: −8.74 (17.47)	
		2: 3.31 (5.00)			2: 0.55 (10.08)	
	Cohorts			*Cohorts*		
	S1	5: −0.12 (3.57)	Avg. Std. Dev. 4.09	S1	5: −9.73 (8.01)	Avg. Std. Dev. 7.50
		6: −8.50 (2.35)			6: −32.81 (16.65)	
		7: 2.35 (3.75)			7: 7.04 (6.71)	
		8: −0.12 (2.84)			8: 0.54 (1.73)	
	S2	1: 4.98 (3.64)		S2	1: 4.56 (2.91)	
		2: 1.72 (3.12)			2: −3.40 (4.09)	
		3: −2.62 (3.43)			3: −11.16 (11.13)	
		4: 9.17 (10.00)			4: 12.22 (10.46)	

that investors are generally risk-seeking. Instead, they appear susceptible to the endowment effect that leads to asking prices far too high to be explained by traditional economic theory. The differences between buying and selling behavior may suggest that risk preferences are more context-dependent than assumed by economic theory. (The framing literature of Kahneman and Tversky [1979] is probably the most well-known example of the context dependency of risk preferences). Such dependency suggests that one must be very cautious in generalizing the results of the present experiment to other settings.

Interestingly, our endowment effect vanishes when examining market asks at shallow depths, because the market ask reflects the asking price of the investors who are least susceptible to the effect. Endowment effects become more apparent at greater market depths, because a large number of asks also reflect the asking prices of investors more susceptible to the effect. The elimination of the endowment effect at shallow depths is similar to the results of Kachelmeier (1996), who finds that a sunk-cost bias affects individual bidding and asking behavior, but not market equilibrium prices. The emergence of the endowment effect at greater depths is closely tied to the notion that "if the market is smart, traders need not be," as discussed in Gode and Sunder (1997). At the margin, the market rules are strong enough to allow only the least-biased investor to influence prices. At greater depths, the market rules are less restrictive because we consider the asks of even highly biased investors.

We can see several directions for further experimental research. Future experiments might also investigate how disclosure quality regarding one security might affect the prices and liquidity of another. Our experiments allow such tests because securities are always traded in pairs. In repeated measures analyses (not reported), we found no evidence that the price or liquidity of one security might be affected by the other security's disclosure quality. However, investors in our setting are provided with a very large cash endowment; thus, the firms need not compete too severely for capital. Cross-security effects may become larger when competition for capital increases.

Future research might also investigate how investors' responses to different levels of disclosure quality alter managers' disclosure choices. Our experiment manipulates disclosure exogenously, in order to avoid the difficulties of interpreting the effects of an endogenous variable that might be correlated with other factors affecting market prices. It is natural to infer that managers who are given the choice would choose high-quality disclosures, in an attempt to enjoy the higher prices observed in our study. However, disclosure effects might be very different when the quality of disclosure is chosen endogenously, because investors could use the manager's choice to draw inferences about the manager's private information. Future research might examine disclosure effects in a setting in which disclosure is a strategic choice of the firm, as in King (1996). Such research might be able to speak to the determinants of various reporting strategies, and how strategic disclosures affect market beliefs.

APPENDIX
LABORATORY STOCK MARKET INSTRUCTIONS

Overview. During this session, you will trade many pairs of securities. At the beginning of trading for each pair, you will receive an endowment in a laboratory currency called "francs." You can use that currency to buy securities, which you can trade for several rounds. After the last round of trading in each pair, both securities pay a liquidating dividend, so that you will hold only francs again. Francs are converted into U.S. dollars at the end of the session.

Security Values. Each security's liquidating dividend (in francs) is equal to 2,100 plus the sum of 7 random numbers. This sum is referred to as the security's "value." Each random number is drawn from the interval [−25,+25], with each outcome equally likely. The values are always drawn randomly and independently in each period. Everyone always knows either 2 or 6 of the 7 numbers for each security. Everyone always knows the same 2 or 6 signals.

Initial Public Offering. At the beginning of trade for each security pair, you are given 50,000 francs. You then enter a "demand schedule" to indicate how many shares of each security you would like to buy at various prices. You can buy up to 8 shares of each security at the opening of trade. There are a total of 20 shares of each security available.

When all traders have entered their demand schedules, a "clearinghouse" computer determines for each security the price at which investors wish to purchase exactly 20 shares. This price is called the "market clearing" price for that security. All trades are executed at that price. In the event that there are many market clearing prices, the computer chooses the midpoint of them. If any investors are indifferent between two trades at the market clearing price, the computer uses a randomization routine to give them the trades that allow the market to clear.

Continuation of Trading. After the public offering, there is a series of trading rounds in which you can trade shares of each security with other investors. No additional shares are offered, so there are always exactly 20 shares of each security in the market. As in the opening round, you enter a demand schedule. You can buy and sell up to 4 shares of each security in each round, but can not sell shares you don't own (there is no "short selling"). The market clearing price is the price at which there are as many shares bought as sold. The computer deals with multiple market clearing prices and trader indifference the same way as in the Initial Public Offering.

Starting with the third continuation round of trading, there is always a 50% chance that a given round of trading is the last in that security pair. Thus, there is a 50% chance of three trading rounds (the Initial Public Offering and two continuation rounds), a 25% chance of four trading rounds, a 12.5% chance of five trading rounds, and so on. Investors never know that a round is the last round of trading for a security pair until that round is over.

Forced Trades. For one of the trading sessions, two investors will be forced to buy or sell up to 4 shares starting with the second continuation trading round in each security pair. Either both investors will be forced to buy or both will be forced to sell. If you are selected in a given round, you must trade exactly as many shares as required, no more and no less. Your only decision is how to divide your trade between the two securities. All investors are always told whether forced trades are possible or not for a security pair, even before trading begins in that pair. You will never be forced to sell shares you don't own or buy shares that don't exist.

Feedback. After each trading period, you will see the following information about each security:

(1) the market clearing price,
(2) the number of total shares traded at the market clearing price,
(3) the number of shares you personally traded in that period,
(4) how many shares were demanded and supplied at each possible price, and
(5) how much your trades influenced the market price.

Determining Your Winnings. At the end of trading in a security pair, all shares of each security are converted into their true cash value. The total cash holdings will determine your ultimate winnings in dollars, as described below. If you gain or lose money in one security pair, that will not affect your starting endowment in cash or shares for the next pair. Your cash winnings for each session will be determined by the number of francs you hold at the end of that session. Francs are converted into cash according to the formula:

Dollar winnings = (Francs held at end of session − "Floor") × Conversion Rate.

You will not learn the floor or conversion rate. However, these parameters are set so that the average winnings will be approximately $30 per session. If you earn fewer francs than the "Floor" you are given a minimum payment of $10. The two sessions are independent: francs or dollars gained in one session are not at risk in the second session, and francs or dollars lost in the first session cannot be recovered in the second session.

I consent to participate in this experiment, and agree to abide by all of the rules determined by the experiment coordinator throughout my participation. I recognize that: (1) if I breach any of the rules governing the market, I forfeit my right to any money I might have earned by participating; (2) I have the right to leave the experiment at any time, without penalty, but that in doing so I forfeit my right to any money I might have earned by trading; (3) this experiment has been approved by the Cornell University Committee on Human Subjects as research that uses **no deception of any kind.**

Signature ____________________ Date ________

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Investor Sophistication and Patterns in Stock Returns after Earnings Announcements

Eli Bartov
New York University
Suresh Radhakrishnan
University of Texas at Dallas
Itzhak Krinsky
McMaster University

ABSTRACT: This study tests whether the observed patterns in stock returns after quarterly earnings announcements are related to the proportion of firm shares held by institutional investors, a variable used by prior research to proxy for investor sophistication. Our findings show that the institutional holdings variable is negatively correlated with the observed post-announcement abnormal returns. Our findings also show that traditional proxies for transaction costs (i.e., trading volume, stock price) as well as firm size have little incremental power to explain post-announcement abnormal returns when institutional holdings is an explanatory variable. If institutional ownership is a valid proxy for investor sophistication, these findings suggest that the trading activity of unsophisticated investors underlies the predictability of stock returns after earnings announcements. However, tests evaluating the validity of institutional holdings as a proxy for investor sophistication yield only mixed results. This calls for caution in interpreting our findings.

Key Words: *Anomalies, Post-earnings-announcement drift, Market efficiency, Institutional investor holdings, Transaction costs.*

Data Availability: *All data are available from public sources.*

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I. INTRODUCTION

Since it was first documented in the late 1960s, the predictability of stock returns after earnings announcements (i.e., the post-earnings-announcement drift anomaly) has attracted substantial attention from accounting researchers. Early studies (e.g., Holthausen 1983; Foster et al. 1984) investigated whether this anomaly could be attributed to the inadequacy of the CAPM as a model of asset pricing, biased parameter estimates of the CAPM, or to research designs that assumed information was available to the market before its public release. These explanations are consistent with market efficiency, but none of them could fully account for the observed drift.

Rendleman et al. (1987), Freeman and Tse (1989), Bernard and Thomas (1990), and Bartov (1992), among others, provide evidence that the drift represents the market's failure to fully reflect the attributes of the stochastic process underlying earnings. Results in Bernard and Thomas (1990), for example, suggest that while the Brown and Rozeff (1979) model (hereafter Brown-Rozeff model) best describes the process underlying the quarterly earnings time series, stock prices reflect an earnings expectation described by a seasonal random walk.[1] Still, they wonder why stock prices in competitive markets such as NYSE and AMEX fail to reflect the true earnings process. Ball and Bartov (1996) further investigate the market's failure to respond to quarterly earnings announcements in a manner that fully reflects the time-series properties of quarterly earnings. Specifically, they present evidence suggesting that the market does characterize the process underlying earnings as containing both positive autoregressive terms (first two lags) and a negative autoregressive term (fourth lag), but the market systematically underestimates its parameters. Given this evidence, Ball and Bartov (1996, 335) conclude that drift may be due to "biases in investors' assessments of the serial correlation magnitudes, or alternatively to biases in researchers' assessments of the ability of earnings to predict abnormal returns."

Bhushan (1994) investigates the relation between the magnitude of post-earnings-announcement drift and proxies for transaction costs. He points out that, even in informationally efficient markets, drift may exist up to the magnitude of transaction costs because sophisticated investors will not trade unless their expected profits from trading on mispricing exceed the transaction costs.[2] Tests of the relation between transaction costs and drift indicate a positive correlation between the magnitude of the drift and the costs of trading. Bhushan (1994, 62) concludes that transaction costs influence the trading and arbitrage activities of professionals in a way that preclude them from taking positions that would eliminate drift.

Our study further investigates whether drift is a manifestation of inefficient processing of quarterly earnings by examining the relation between drift and investor sophistication. As discussed in detail in the next section, we conjecture that post-earnings-announcement drift in stock prices will be most pronounced for stocks held primarily by unsophisticated investors who misperceive the process that underlies earnings to be a seasonal random walk. Conversely, mispricing will be least pronounced for stocks largely held by sophisticated investors who characterize correctly the process underlying earnings. An intuition for such a result is that stock prices reflect a weighted average of both sophisticated investors' expectations and unsophisticated investors' expectations, and consequently, the greater the involvement of sophisticated investors in a stock, the greater their influence on its price.[3] Along the lines of prior empirical studies (e.g., Hand 1990; Utama and Cready 1997; Walther 1997; El-Gazzar 1998), we use institutional investor holdings of a stock to proxy for the sophistication of the firm's ownership.

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[1] Brown and Rozeff (1979) proposed that the process that generates seasonal changes in quarterly earnings may be reasonably approximated as first-order autoregressive with a seasonal moving-average term that accounts for the negative autocorrelation at the fourth lag. Bathke and Lorek (1984) show that the Brown-Rozeff model is superior to a seasonal-random-walk model in terms of absolute forecast errors.

[2] While this statement represents a reasonable approximation to reality, it is not always true. Institutions might trade at a loss for fiduciary (e.g., Del Guercio 1996) or window dressing (e.g., Bildersee and Kahn 1987) reasons.

We find that the institutional holdings variable is important in explaining both the drift and the stock-price responses to subsequent earnings announcements. More specifically, OLS results from regressing post-earnings-announcement returns on two explanatory variables, an earnings-surprise variable and an institutional-holdings variable, show that the parameter estimates on both variables have the predicted signs and are statistically significant. To wit, the earnings-surprise variable is positively correlated with post-earnings returns, whereas the institutional-holdings variable is negatively correlated with these returns. The latter result suggests that sophisticated investors reduce drift. We also run multiple-regression tests for the relation between institutional holdings and the predictability of stock returns after earnings announcements that control for transaction costs (Bhushan 1994). In addition, we control for firm size due to results of prior research (e.g., Foster et al. 1984) showing that drift varies with firm size. The results show that the explanatory power of the institutional holdings variable is above and beyond the control variables. Furthermore, proxies for transaction costs, i.e., trading volume and stock price, shown by prior research to be significant in explaining mispricing after earnings announcements, become insignificant once the institutional holdings variable is added to the regression.

Under the presumption that institutional holdings is a valid proxy for investor sophistication, our findings imply that the trading activities of unsophisticated investors are a cause of the predictability of stock returns after earnings announcements. However, tests evaluating the validity of the institutional holdings variable as a proxy for investor sophistication, in terms of incorporating earnings information into stock prices in a timely fashion, yield only mixed results. This raises the possibility that the institutional-holdings variable is not a valid proxy for investor sophistication, and thus calls for caution in the interpretation of our findings.

The remainder of this article is organized as follows. Our hypothesis and its empirical implications summarized above are developed in detail in Section II. Section III outlines the sample selection procedure, defines the variables, and describes the data. Section IV discusses the tests and reports the results. The final section offers concluding remarks.

II. MOTIVATION, RESEARCH QUESTION, AND METHODOLOGY

Motivation and Research Question

Numerous studies over the last three decades have demonstrated that there is a predictable component to abnormal stock returns after earnings announcements. Early work documented that abnormal stock returns are predictable up to two months after annual earnings announcements (e.g., Ball and Brown 1968) and up to 60 trading days after quarterly earnings announcements (e.g., Foster et al. 1984). Rendleman et al. (1987), and

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[3] The idea here that sophisticated and unsophisticated investors influence the stock price has some similar implications as Hand's (1990, 745–747) model that a firm's price depends on the probability that the "marginal investor" is sophisticated or unsophisticated. In Hand's (1990) model, a firm's stock price is set by the marginal investor, who can be sophisticated or unsophisticated, investing in that firm. The idea advanced here is that the trading activities of all investors influence a firm's stock price because the price change from each trade represents a draw from the distribution of the investor's assessment of what the price change should be. The price change per period, then, is a sum of random variables.

Freeman and Tse (1989) conjecture that the drift in stock returns may represent misperceptions of the time-series properties of earnings, and provide some preliminary evidence that points to this direction.

Bernard and Thomas (1990) conduct a battery of tests of this conjecture. Their findings show that a disproportionately large part of the drift occurs over three-day windows around subsequent announcements of quarterly earnings. Furthermore, the signs of these three-day returns mimic the autocorrelation structure of earnings. Bernard and Thomas (1990) conclude that the drift occurs because investors misperceive quarterly earnings to be a seasonal random walk, while the actual process is a seasonally differenced first-order autoregressive process with a seasonal moving-average term that accounts for the negative autocorrelation at the fourth lag (Brown and Rozeff 1979). Still, Bernard and Thomas (1990, 338) themselves are somewhat puzzled by their findings, "In some ways, evidence like that presented here raises more questions than answers. Why markets as competitive as the NYSE or AMEX would behave as if they are influenced by naïve earnings expectations is difficult to understand." Bartov (1992, 622) echoes similar sentiment when discussing his conclusion that drift represents misperceptions about the earnings process.

Ball and Bartov (1996) further investigate the conjecture that the market misperceives the process underlying earnings. They present evidence suggesting that the market does characterize the process underlying earnings as Brown-Rozeff, but systematically underestimates its parameters. In Ball and Bartov's (1996) view, this evidence, which was corroborated by results from laboratory experiments reported by Maines and Hand (1996), opens up the possibility that drift could represent either biases in investors' assessment of the serial correlation of quarterly earnings changes or alternatively biases in researchers' assessments of the ability of earnings to predict abnormal returns.

The primary purpose of the current study is to evaluate the conjecture that misperception of the earnings process is a cause of the post-earnings-announcement drift in abnormal returns by first developing and then testing a particular implication of this conjecture.

Theoretical Considerations and Testable Hypotheses

The development of our hypothesis adopts some of the assumptions contained in prior empirical and analytical work. Like Hand (1990) and Kim and Verrecchia (1994), we assume that there are two types of investors. Some market participants are sophisticated investors who are experts in gathering and processing public information. Conversely, other investors are unsophisticated; i.e., they primarily use information in the financial press and intuition rather than performing rigorous analysis of financial statements.

We also assume that a sophisticated investor is able to characterize the autoregressive nature of the process underlying earnings correctly and able to unbiasedly estimate its parameters (with sampling errors). Conversely, we assume that unsophisticated investors perceive the process to be a seasonal random walk. Such an assumption is consistent with an unsophisticated investor's reliance on the financial press whose primary focus is on a comparison of earnings of the current quarter with the earnings of the equivalent quarter of the previous year (e.g., the "Digest of Earnings Reports" in the *Wall Street Journal.*) Finally, we assume that stock prices reflect a weighted average of all investors' assessments of a firm's future prospects and value. In other words, security returns around earnings announcements reflect the unbiased future earnings estimates of sophisticated investors as well as the biased estimates of unsophisticated investors. Furthermore, our tests are predicated on the notion that the higher the holdings of sophisticated investors in a stock, the greater the influence of their view on the stock price. In the extreme, if a stock is held exclusively by sophisticated investors, then the stock price will reflect only the unbiased earnings expectations of sophisticated investors. Conversely, if a stock is held exclusively by unsophisticated investors, then the stock price will reflect only their biased, random-walk-based estimates of future earnings.

Sophisticated investors might be expected to trade on and quickly correct the mispricing that arises from the trades of unsophisticated investors. However, there appear to be liquidity and/or other constraints on the investing activities of many institutional investors. For example, Bhushan (1994, 47) reports that even among fund managers who specialize in growth companies and small capitalization stocks, investments are not made in firms with an annual trading volume of less than $50 million or with a market capitalization that is smaller than $100 million. In addition, diversification concerns of institutional investors may prevent them from taking full advantage of their superior information about any single firm. If constraints on institutional investors' trading and arbitrage activities do not exist, then their investment positions—whether large or small—should be sufficient to eliminate any mispricing not explained by transaction costs. In such a case, our prediction that there will be a relation between post-earnings-announcement drift and institutional investor holdings after controlling for trading costs would be unlikely to hold.

The idea that security prices are influenced by the trading activities of both sophisticated and unsophisticated investors provides a testable prediction about the cross-sectional variation in abnormal stock returns after earnings announcements. Post-earnings-announcement drift will be most pronounced for a stock held primarily by unsophisticated investors because, when responding to earnings announcements, they ignore the valuation implications of the autocorrelation structure underlying the quarterly earnings process and because they heavily influence the stock price. More generally, we predict that mispricing after earnings announcements and levels of sophisticated investor holdings will be negatively related. This prediction is consistent with a stock price that reflects a weighted average of investors' assessments of a firm's future earnings where the weight on the sophisticated investors' view is increasing in the sophisticated investors' holdings.

Proxies for Sophisticated Investors and Transaction Costs

To test these implications, we must choose a proxy for investor sophistication. Institutional investor holdings of a stock has been widely used as a proxy for investor sophistication in prior literature (e.g., Hand 1990; Utama and Cready 1997; Walther 1997; El-Gazzar 1998), and that is what we use in our tests. One feature that makes institutional holdings a suitable proxy is that institutional investors have a relative advantage in gathering and processing information. Thus, they are generally better informed than individual investors and even market specialists, who do little analysis on their own prior to trading (e.g., Mayer 1988, 211; Shiller and Pound 1989; Yunker and Krehbiel 1988). Another desirable feature is that the institutional holdings are readily available for a large number of firms. Section 13(f) of the Securities and Exchange Act of 1934, enacted by Congress on June 4, 1975, requires all institutional investors managing at least $100 million in securities (or a lesser amount as the Commission may determine, but not less than $10 million) to file a quarterly report of their holdings that are in excess of 10,000 shares or $200,000 in market value.

Using institutional investor holdings as a proxy for the holdings of sophisticated investors does have some construct validity problems. A review of section 13(f) reveals two potential weaknesses. First, section 13(f) includes institutions that follow passive (index) investment strategies and thus cannot be considered sophisticated investors. This problem tends to bias our results toward the null hypothesis. Second, section 13(f) does not cover holdings of insiders, individuals, raiders, arbitrageurs, brokerage firms, and corporations, and thus their holdings are not included in our measure of institutional holdings. This raises the possibility that our tests suffer from a correlated omitted-variable problem. This concern is alleviated, however, by evidence in Agrawal and Knoeber (1996) that indicated institutional holdings are not correlated with insiders holdings and only weakly (negatively) correlated with large (greater than 5 percent) block holdings.

Finally, the theory developed by Glosten and Milgrom (1985) points to another potential limitation of using the institutional holdings variable as a proxy for investor sophistication. They demonstrate that the bid-ask spread (a component of transaction costs) is increasing in the number of sophisticated investors relative to liquidity (or unsophisticated) investors trading a stock. The intuition underlying this result is that the specialist loses on trades with sophisticated investors and gains on trades with liquidity (unsophisticated) investors. Thus, other things being equal, the higher the relative number of sophisticated investors, the higher the bid-ask spread must be for the specialist to break even. This Glosten and Milgrom (1985) argument implies that higher levels of transaction costs associated with higher levels of institutional investor holdings may prevent informed trading in the stock of firms with high institutional holdings, since investors trade only if their expected profits from trading exceed their transaction costs. Thus, the relatively high transaction costs associated with trades of shares of firms with high institutional holdings may lead to no relation between institutional holdings and mispricing after earnings announcements. This limitation, however, should not be overemphasized. In our analysis we use trading volume and stock price to control for transaction costs. Evidence in Chiang and Venkatesh (1988, 1047, Table 2) demonstrates that the institutional-holdings variable has little power in explaining the bid-ask spread when other trading cost proxies—trading volume and return variability—are included as independent variables. Thus, institutional holdings do not appear to proxy for transaction costs in the presence of other, more direct proxies for transaction costs.

Two different proxies are used to control for transaction costs in our empirical analysis. One proxy is the annual dollar volume of trade (defined more precisely in the section below). Prior research (e.g., Chiang and Venkatesh 1988) has shown that volume of trade is highly (negatively) correlated with the bid-ask spread (a component of transaction costs). The other proxy used to control for transaction costs is share price. Bhushan (1994) used both trading volume and share price as transaction-cost proxies in his study of the relation between transaction costs and drift. Consistent with Bhushan (1994), we assume that higher share price and greater trading volume reflect lower per-share transaction costs.

III. DATA

This section outlines the sample selection procedure, defines the variables, and describes the sample.

Sample Selection

The final sample consists of 19,777 firm-quarter observations from the fourth fiscal-year quarter of 1989 to the fourth fiscal-year quarter of 1993 for NYSE/AMEX firms. The sample selection procedure, summarized in Table 1, consisted of the four stages outlined below.

First, we required that earnings before extraordinary items and discontinued operations be available on the quarterly Compustat database for 21 consecutive quarters in the interval from the third quarter of 1984 through the fourth quarter of 1993. 20 consecutive quarters, quarters −21 to −1 (the estimation period), are required for estimating the parameter of the seasonal random walk with a trend model, which is used to estimate the expected

TABLE 1
Sample Selection

	Firms *Number/Percent*	*Observations* *Number/Percent*
Firm/observation with necessary quarterly data on Compustat and in NYSE/AMEX[a]	2,515/100	24,605/100
No institutional holdings data[b]	342/14	4,447/18
No CRSP data[c]	23/1	227/1
Outliers[d]	13/01	154/1
Final sample	2,137/84	19,777/80

[a] Sample firms were required to have (1) earnings before extraordinary income and discontinued operations for 21 consecutive quarters in the interval 1983–84 to 1993–94 and earnings announcement dates in the quarterly Compustat; (2) the closing share price, trading volume, the number of shares outstanding in the annual Compustat; and (3) belong to NYSE/AMEX exchanges.

[b] Observations without common stock holdings data on the CDA spectrum database were eliminated from the sample.

[c] Observations without CRSP data on raw returns or size-deciles for the four quarters subsequent to each quarterly earnings announcement and observations without CRSP data on the number of common shares outstanding at the end of the preceding quarter were eliminated from the sample.

[d] Observations in the 0.25 percent extreme tails of the distributions of AR12 and CAR60 were eliminated. $AR12 = CAR3_{q+1} + CAR3_{q+2} + CAR3_{q+3} - CAR3_{q+4}$, where $CAR3_q$ is the sum of abnormal returns in the three days $(-2, -1, 0)$ relative to the earnings-announcement date (day 0) in quarter q, with $(q + 1)$, $(q + 2)$, $(q + 3)$, and $(q + 4)$ representing the abnormal returns around the four subsequent quarters' earnings announcement. Daily abnormal returns are the differences between the daily returns of a firm and the returns for NYSE/AMEX firms of the same size-decile, based on January 1 market values. CAR60 denotes daily abnormal returns cumulated over the interval $0 - 59$, where 0 is the earnings announcement date and 59 is the number of trading days elapsed from day 0. The sample was reduced by 0.73 percent instead of 1.00 percent because these two criteria eliminated some of the same observations.

earnings for quarter 0 (the event quarter).[4] Earnings of quarter 0 are required for computing the earnings surprise in the event quarter. Additionally, quarterly earnings announcement dates for the event quarter and the ensuing four consecutive quarters were required from the Compustat quarterly database to estimate returns around these earnings announcements. Also, the number of common shares traded measured over the fiscal year preceding the year to which the event quarter belongs, the number of common shares outstanding, and the closing share price at the beginning of the fiscal year to which the event quarter belongs were required from the annual Compustat database so as to compute the annual dollar volume in a stock and the market value. Finally, we required that the firm belong to either NYSE or AMEX, so as to maintain comparison with earlier studies. These requirements yielded 24,605 firm-quarters covering 2,515 distinct firms.

Second, we obtained data on institutional holdings for each firm-quarter meeting the first set of requirements from the CDA Spectrum database.[5] The CDA Spectrum database contains the total number of common shares held by institutions at the end of each calendar quarter based on Section 13(f) filings. We required that data on institutional holdings be available for the calendar quarter immediately preceding the quarterly earnings announcement. This second requirement reduced our sample size to 20,158 firm-quarters, representing 2,173 firms.

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[4] For more details on the estimation of this seasonal random walk with a trend model see, Bartov (1992, 613).

[5] CDA Spectrum is a unit of CDA Investment Technologies, a provider of information services. Detailed information about CDA Spectrum may be obtained from its web site at http://www.cda.com/html/divisions.html.

Third, from the CRSP database for each quarterly earnings announcement we required that (1) the daily stock returns for 300 trading days after the earnings announcement date be available; (2) the CRSP size-decile portfolio assignment for each firm-quarter be available; (3) the associated NYSE/AMEX size-decile daily returns be available;[6] and (4) the number of common shares outstanding at the end of each calendar quarter be available. The first three data requirements allowed us to compute the daily (size-adjusted) abnormal returns based on the companion-portfolio approach (defined below). The last data requirement allowed us to compute the proportion of institutional holding. This set of requirements reduced the size of our sample to 19,931 firm-quarters representing 2,150 distinct firms. Finally, we deleted 0.25 percent extreme observations from each tail based on the abnormal-return variables AR12 and CAR60 (defined below).[7] Due to a partial overlap between the two criteria, the sample of 19,931 was reduced by only 0.73 percent instead of 1 percent, to 19,777 observations.

Variable Definitions

For each observation, we calculate the cumulative abnormal return (CAR) using the companion-portfolio approach. The daily abnormal return for firm j on day t (CAR_{jt}) is computed as the difference between the daily return of firm j on day t and the equally weighted average returns on day t for NYSE/AMEX firms in the same size-decile based on January 1 market values:

$$CAR_{jt} = R_{jt} - R_{pt} \tag{1}$$

where R_{jt} is the daily return of firm j on day t, and R_{pt} is the equally weighted average return for day t of all NYSE/AMEX firms in the same size-decile as firm j, based on January 1 market values. $CAR60_j$ denotes daily abnormal returns of firm j cumulated over the 60 trading-day interval (0, 59), where 0 is the earnings announcement date from Compustat.

$CAR3_{jq}$ denotes the sum of abnormal daily returns (CAR_{jt}) of firm j for the three-trading-day period (t = −2, −1, 0), where 0 represents the earnings announcement date of quarter q from Compustat. $AR12_j$ represents the sum of $CAR3_{jq}$ in the three subsequent quarters less $CAR3_{jq}$ in the fourth subsequent quarter:

$$AR12_j = CAR3_{j(q+1)} + CAR3_{j(q+2)} + CAR3_{j(q+3)} - CAR3_{j(q+4)}. \tag{2}$$

To evaluate the possibility that mismeasured expected returns caused our results, we perform two types of sensitivity tests by controlling for (1) book-to-market ratios, and (2) book-to-market ratios and firm size (e.g., Fama and French 1992). We measure daily abnormal returns for the former as the difference between the daily raw returns of a firm and the returns for NYSE/AMEX firms of the same book-to-market decile based on the book-to-market value of the immediately preceding fiscal year, and for the latter as the difference between the daily raw returns of a firm and the returns for NYSE/AMEX firms of the same size quartile (based on January 1 market values) and the same book-to-market quartile. The cumulative-abnormal-return variables we use in the sensitivity tests, BAR12 and BZAR12 for 12-day returns, and BCAR60 and BZCAR60 for 60-day returns, are identical to AR12 and CAR60, respectively, except that they are based on these new measures of abnormal returns.

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[6] CRSP database provides a portfolio assignment for each firm based on its market value at the beginning of the calendar year as the variable PRTNUM. Specifically, PRTNUM indicates the size-decile for each firm in the NYSE/AMEX exchange based on the market value of its common shares at the beginning of the calendar year. For each PRTNUM, an equally weighted average daily return is computed and is available as the variable DECRET. PRTNUM is the portfolio assignment requirement and DECRET is the daily returns of the associated size-decile portfolio.

[7] Trimming outlying abnormal return observations is motivated by findings in Knez and Ready (1997), who demonstrate that the risk premium on size that was estimated by Fama and French (1992) completely disappears when the 1 percent most extreme observations are trimmed each month. Trimming 1 percent rather than 0.5 yielded qualitatively similar results.

We measure unexpected earnings, DSUE, as in previous research on post-earnings-announcement drift (e.g., Bernard and Thomas 1990). First we estimate the expected earnings of firm i for quarter t by a seasonal random walk model with a trend.[8] We then compute SUE_{it}, the standardized unexpected earnings of firm i in quarter t, by scaling the difference between the reported and expected earnings by the standard deviation of forecast errors over the estimation period. Finally, we classify SUE_{it} into deciles ($DSUE_{it}$), based on the sample distribution of SUE each calendar quarter, with zero representing the smallest decile of institutional holdings and nine representing the largest, and then scale them to range between zero and one.[9]

The institutional investor holdings for firm j in calendar quarter q (IH_{jq}) is computed as the proportion of common shares outstanding held by institutional investors. Specifically, we compute IH_{jq} by dividing the number of common shares held by institutional investors at the end of the quarter just prior to each earnings announcement by the number of common shares outstanding on that date. The size of firm i associated with the earnings announcement of quarter t, MV_{it}, is the market value of common equity at the beginning of the fiscal year to which quarter t belongs. MV_{it} is the product of the number of common shares outstanding and the closing share price at the beginning of the fiscal year from Compustat. The firms in the sample are also classified into firm-size deciles (DMV_{it}). As before, decile classifications DIH and DMV take on a value of zero for the smallest decile and nine for the largest and are then scaled to range between zero and one.

The dollar trading volume of firm i associated with the earnings announcement of quarter t (VOL_{it}) is measured over the fiscal year preceding the year to which quarter t belongs. VOL_{it} is obtained by multiplying the number of common shares traded by the closing price from the Compustat database. The trading volume variable is classified into five groups (QVOL), where QVOL equals zero when trading volume is less than $5 million, one when trading volume ranges between $5–25 million, two when trading volume ranges between $25–50 million, three when trading volume ranges between $50–200 million, and four when trading volume is greater than $200 million. We base the cut-off values for these classifications on the sample characteristics of Bhushan (1994).[10] PRC_{it} is the closing price of firm i's common share associated with the earnings announcement of quarter t. PRC_{it} is measured as the closing share price of firm i at the beginning of the fiscal year to which quarter t belongs. BPRC is the binary classification of PRC into two groups, with zero representing a closing price below \$10 per share and one representing a closing share price above \$10.

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[8] The trend is estimated by using the most recent 20 quarters of data, beginning with quarter t − 21 and going through quarter t − 1 (the estimation period).

[9] As in Bernard and Thomas (1990) and Bhushan (1994), the SUE decile assignment is based on the distribution of SUEs for the current quarter, not the prior quarter. While this may cause a hindsight bias in post-earnings announcement abnormal returns, Bernard and Thomas (1990, footnote 7) report that the magnitude of drift is insensitive to this research design choice.

[10] The results of our study are robust to classifying trading volume into three groups with trading volumes below $5 million, between $5–150 million, and greater than $150 million. With other classification schemes trading volume is not significant, but even with other specifications the institutional holdings variable is always significant.

Description of the Sample

Panel A of Table 2 provides descriptive statistics for the return variables used in the study. There are two points to notice. First, the full sample contains outliers, as evidenced

TABLE 2
Descriptive statistics

Variable[a]	*n*[b,c]	*Mean*	*Standard Deviation*	*Minimum*	*First Quartile*	*Median*	*Third Quartile*	*Maximum*
Panel A: Dependent Variables								
AR12 (%)	19777 (19931)	0.75	10.51	−48.06 (−365.62)	−4.56	0.35	5.73	67.32 (730.29)
BAR12 (%)	18026 (18168)	0.41	10.13	−45.10 (−180.48)	−4.84	0.06	5.32	54.55 (207.57)
BZAR12 (%)	18013 (18168)	0.46	10.12	−45.20 (−180.91)	−4.80	0.08	5.42	56.15 (205.84)
CAR60 (%)	19777 (19931)	1.66	16.39	−60.36 (−102.43)	−7.51	0.94	9.96	98.42 (394.07)
BCAR60 (%)	18026 (18168)	−1.48	15.63	−63.02 (−108.13)	−10.49	−2.00	6.60	87.87 (460.65)
BZCAR60 (%)	18013 (18168)	−0.97	15.60	−63.58 (−110.61)	−9.68	−1.27	7.17	81.31 (176.04)
CAR3 (%)	19777 (19931)	0.35	5.45	−49.64 (−55.29)	−2.07	0.16	2.50	81.47 (319.83)
Panel B: Explanatory Variables								
SUE_t	19777	−0.70	14.32	−1566.04	−0.97	0.05	1.03	82.53
SUE_{t-1}	13822	−0.59	15.83	−1566.04	−0.91	0.10	1.09	82.53
SUE_{t-2}	13822	−0.66	16.01	−1566.04	−0.97	0.07	1.04	82.53
SUE_{t-3}	13822	−0.75	16.06	−1566.04	−1.08	0.02	0.96	82.53
SUE_{t-4}	13822	−0.80	9.31	−376.32	−1.16	−0.02	0.90	82.53
IH	19777	0.41	0.21	0.00	0.24	0.42	0.58	0.98
MV [\$]	19777	2486.14	6445.02	0.62	130.34	562.43	2047.98	89526.65
PRC [\$]	19777	27.47	20.96	0.19	12.75	23.50	36.75	254.75
VOL [\$]	19777	1603.83	4225.86	0.03	43.21	292.32	1286.27	90671.90

(*Continued on next page*)

TABLE 2 (Continued)

[a] Variable definitions: AR12 = $CAR3_{q+1} + CAR3_{q+2} + CAR3_{q+3} - CAR3_{q+4}$, where $CAR3_q$ is the sum of abnormal returns in the three days (−2, −1, 0) relative to the earnings-announcement date (day 0) in quarter q, with (q + 1), (q + 2), (q + 3), and (q + 4) representing the abnormal returns around the four subsequent quarters' earnings announcement. Daily abnormal returns are the differences between the daily returns of a firm and the returns for NYSE/AMEX firms of the same size-decile, based on January 1 market values. CAR60 denotes daily abnormal returns cumulated over the interval 0–59, where 0 is the earnings announcement date and 59 is the number of trading days elapsed from day 0. BCAR3 and BCAR60 are the cumulative daily abnormal returns, where daily abnormal returns are computed as the difference between the firm's daily return and the returns for NYSE/AMEX firms in the same book-to-market decile at the beginning of the fiscal year, and BAR12 = $BCAR3_{q+1} + BCAR3_{q+2} + BCAR3_{q+3} - BCAR3_{q+4}$. BZCAR3 and BZCAR60 denote the cumulative daily book-to-market and size-adjusted abnormal returns, where the daily abnormal returns are the differences between the daily returns of a firm and the returns for NYSE/AMEX firms of the same book-to-market ratio quartile and the same market value quartile at the beginning of the fiscal year, and BZAR12 = $BZCAR3_{q+1} + BZCAR3_{q+2} + BZCAR3_{q+3} - BZCAR3_{q+4}$. MV is the market value of equity of each firm at the beginning of the fiscal year. SUE_t is the forecast error from a seasonal random-walk model (with trend) earnings-expectation model. First, we estimate the expected earnings of firm i for quarter t, by a seasonal random walk model with a trend. The trend is estimated by using the most recent 20 quarters of data, beginning with quarter t − 21 and going through quarter t − 1. We then compute SUE_t by scaling the difference between the reported and expected earnings by the standard deviation of the forecast errors over the estimation period. PRC represents the share price of each firm at the beginning of the fiscal year. VOL is the annual dollar trading volume in the fiscal year immediately preceding the earnings announcement quarter. IH is the fraction of common shares outstanding held by institutional holders. IH is computed by dividing the number of common shares held by institutional holders by the number of common shares outstanding at the end of the calendar quarter immediately preceding the quarterly earnings announcement date.

[b] n is the number of observations used for the test procedure.

[c] The numbers in parentheses are the maximum and minimum values for the sample before deleting outliers. We deleted 0.25% of the extreme observations from each tail for BAR12 and BCAR60 (BZAR12 and BZCAR60).

by the minimum and maximum. For example, the minimum and maximum values of AR12 are −365.62 percent and 730.29 percent, respectively, while the mean is only 0.75 percent. Table 2 shows, however, that our strategy of deleting 0.25 percent of each tail helps alleviate this problem.

Second, our long-window abnormal-return variable (CAR60) is sensitive to the benchmark portfolio used to proxy for expected returns. For example, the mean and median of CAR60 are both positive, 1.66 percent and 0.94 percent, respectively, while the mean and median of BCAR60 are both negative, −1.48 percent and −2.00 percent. As might be expected, however, our short-window abnormal-return variable, AR12, is less sensitive to the choice of the benchmark portfolio. This is evident because the mean and median of all three short-window abnormal-return variables, AR12, BAR12, and BZAR12, have the same sign, and all three variables are almost identical in terms of the first and third quartiles.

Panel B of Table 2 displays descriptive statistics for all explanatory variables used in the study. As may be expected when market and accounting data are pooled over time and across firms, all variables (except institutional holdings, IH) contain outliers. To alleviate problems associated with these outliers, in the tests that follow we use categorical classifications for all independent variables (DSUE, DIH, QVOL, BPRC, and DMV). We opted for using categorical classifications for the explanatory variables rather than trimming outlying observations to allow comparison with prior research (e.g., Bhushan 1994).

The mean institutional holdings proportion is 41 percent, the median is 42 percent, and the distribution is approximately symmetric around the mean. The firm size variable (MV) is skewed to the right as evident by the difference between the mean (2486.14) and median (562.43). This nonsymmetry is due to a small number of firms with relatively very large size. The transaction-cost variables, trading volume and stock price, are also skewed to the right, indicating that a small number of firms have relatively large stock prices and trading activity. About 20 percent of the observations have a share price less than $10 per share.

The sample period spans 17 fiscal quarters from the fourth quarter of 1989 to the fourth quarter of 1993. Both the sample period and the sample size in our study differ from those of earlier studies; this motivates us to examine whether our sample is comparable in the sensitivity analysis section below.

IV. TESTS AND RESULTS

Institutional Holdings, Transaction Costs, and Stock Returns after Earnings Announcements

Table 3 reports the OLS parameter estimates together with their significance levels for two regression models. Panel A reports the results for Model 1, in which two alternative dependent variables measuring abnormal returns after the earnings announcement, AR12 and CAR60, are regressed on two explanatory variables: DSUE, a measure of the earnings surprise, and an interactive term, DSUE*DIH, that captures the marginal effect of institutional holdings on the slope of the variable DSUE. As expected, the results in Panel A show that for both dependent variables, AR12 and CAR60, the coefficient estimates on the earnings-surprise variables (DSUE) are positive and significant, and the coefficient estimates on the institutional holdings variables (DSUE*DIH) are negative and significant. For example, when CAR60 is the dependent variable, the estimated coefficient of DSUE is 8.77 with a t-statistic of 18.29, and the estimated coefficient of DSUE*DIH is −4.86 with a t-statistic of −7.94. These results imply that for firms in the top SUE decile (i.e., DSUE = 1) the average 60-day post-earnings-announcement drift ranges from 7.28 percent when institutional holdings are low (DIH = 0) to 2.42 percent when institutional holdings are high (DIH = 1). This suggests that the magnitude of post-earnings-announcement drift is significantly smaller in firms with high institutional ownership.[11] Still, mispricing after earnings announcements exists even for firms in the highest institutional holdings decile (DIH = 1). This is consistent with the fact that even the firms in our highest institutional-holdings decile are partially owned by unsophisticated investors, i.e., the mean IH is 0.76 when DIH = 1.

Panel B of Table 3 reports the results for Model 2, which augments Model 1 by including interaction variables to control for the potential effects of transaction costs and firm size on the magnitude of post-earnings-announcement drift.[12] The results for Model 2 support those of Model 1; in both panels the estimated coefficients on DSUE*DIH have the predicted sign and are statistically significant. The explanatory power of the institutional holdings variable is thus above and beyond firm size and transaction costs. However, the results for the control variables—firm size, share price, and trading volume—are generally insignificant for both AR12 and CAR60.[13] Thus, unlike Bhushan's (1994) results, which

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[11] Similar but weaker results hold when AR12 is the dependent variable. For firms in the top SUE decile, when DIH = 1 the cumulative abnormal returns around the four subsequent earnings announcements are 0.31 percent, and when DIH = 0 these cumulative abnormal returns are 1.78 percent.

[12] Because volume of trade, stock price, firm size, and institutional holdings are all correlated, a multicollinearity problem may arise from using all four as explanatory variables in the same regression. To assess this possibility, we examine the variance inflation factor (VIF) of all explanatory variables in all specifications. The results show that the majority of VIFs are below 4 and that the highest VIF value is 8.98. Given that it is a standard practice to consider only a VIF of more than 10, or even more than 15, a concern (see, e.g., Belsley et al. 1980, Chapter 3, 79), these results indicate that multicollinearity does not represent a serious problem for our tests.

[13] The only exception is the trading volume variable, which is significantly positive when the dependent variable is CAR60. Positive coefficient on the trading volume variable is consistent with Kim and Verrecchia (1994), who show that under certain circumstances the volume of trade can be positively related to transaction costs.

TABLE 3
Institutional Holdings, Transaction Costs, and Size-Adjusted Stock Return Behavior after Earnings Announcements

Panel A: Institutional Holdings and Size-Adjusted Stock Return Behavior after Earnings Announcements

Model 1: $Abnormal\ Returns_{i,t} = k + b_1\ DSUE_{i,t} + b_2\ DSUE_{i,t} * DIH_{i,t} + error_{i,t}$

		Dependent Variable = AR12 (n = 19,777) (Adj. R^2 = 1.2%)			*Dependent Variable = CAR60 (n = 19,777) (Adj. R^2 = 1.7%)*		
	Expected sign	*Coefficient*	*t-statistic*	*Alternative t-statistic*[a]	*Coefficient*	*t-statistic*	*Alternative t-statistic*[a]
Intercept	?	0.46	3.33*	2.51*	−1.49	−6.95*	−2.70*
DSUE	+	1.32	4.28*	2.87*	8.77	18.29*	7.98*
DSUE*DIH	−	−1.47	−3.72*	−2.63*	−4.86	−7.94*	−3.41*

Panel B: Institutional Holdings, Transaction Costs, and Size-Adjusted Stock Return Behavior after Earnings Announcements

Model 2: $Abnormal\ Returns_{i,t} = k + b_1\ DSUE_{i,t} + b_2\ DSUE_{i,t} * DIH_{i,t} + b_3\ DSUE_{i,t} * DMV_{i,t}$
$+ b_4\ DSUE_{i,t} * BPRC_{i,t} + b_5\ DSUE_{i,t} * QVOL_{i,t} + error_{i,t}$

		Dependent Variable = AR12 (n = 19,777) (Adj. R^2 = 1.4%)			*Dependent Variable = CAR60 (n = 19,777) (Adj. R^2 = 1.5%)*		
	Expected sign	*Coefficient*	*t-statistic*	*Alternative t-statistic*[a]	*Coefficient*	*t-statistic*	*Alternative t-statistic*[a]
Intercept	?	0.46	3.32*	2.47*	−1.47	−6.82*	−2.67*
DSUE	+	1.61	3.88*	2.22*	6.83	10.65*	5.65*
DSUE*DIH	−	−1.42	−2.91*	−2.38*	−6.62	−8.73*	−3.73*
DSUE*DMV	?	1.02	1.46	1.63	−1.77	−1.63	−1.55
DSUE*BPRC	−	−0.19	−0.45	−0.39	0.58	0.80	1.09
DSUE*QVOL	−	−0.88	−1.24	−1.39	4.28	3.89	2.51

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* Indicates that the coefficient is statistically significant at an alpha of 5 percent (one-tailed when the coefficient sign is predicted).

[a] The alternative t-statistic is computed by first estimating the regression for each quarter separately, and then dividing the time-series mean estimate of the coefficient by its time-series standard deviation.

Variable definitions: DSUE, DIH and DMV are the decile portfolios for each quarter of SUE, IH, and MV, respectively, and are scaled to range between zero and one. $BPRC_{i,t}$ is the classification into two groups based on the share price of the ith firm at the beginning of the fiscal year relative to the earnings announcement quarter, and it takes on a value of zero if the price is less than 10 and one otherwise. $QVOL_{i,t}$ is the classification into five groups based on the annual dollar trading volume (VOL) of the ith firm in the fiscal year immediately preceding the earnings announcement of quarter t. The five groups are: 0 for trading volume less than or equal to \$5m; 1 for trading volume between \$5m−\$25m; 2 for trading volume between \$25m−\$50m; 3 for trading volume between \$50m−\$200m; and 4 for trading volumes greater than \$200m. $QVOL_{i,t}$, is scaled to range between zero and one. All other variables are defined in Table 2.

lend some support for the importance of transaction costs, our tests fail to document a significant relation between transaction-cost variables (i.e., volume of trade and stock price) and abnormal returns after earnings announcements.[14] In the next section we investigate whether this failure follows from differences in research designs (i.e., the lack of control for institutional holdings in Bhushan [1994]) or in samples.

Sensitivity Tests

We perform two types of sensitivity tests. One set of tests concerns whether the relations in our sample are comparable to those in Bhushan (1994). The other set of tests involves evaluating the sensitivity of our multiple regression results to alternative measures of abnormal stock returns (the dependent variable).

Panel A of Table 4 provides the replication of Bhushan's (1994) Table 5. It is evident that the observed significance levels of the estimated coefficients reported in Bhushan (1994) are substantially higher except for the estimated coefficient of DSUE*DMV, perhaps due to his much larger sample size (73,966 vs. 19,777 observations). However, in both studies the coefficient estimates of DSUE and DSUE*QVL are statistically significant at conventional levels, and the coefficient estimate of DSUE*DMV is not. The coefficient of DSUE*BPRC, however, is significant only in Bhushan (1994). Overall, these tests demonstrate that the relation between post-earnings-announcement drift and transaction-cost proxies in our sample is comparable to their relation in Bhushan's (1994) sample, when DSUE*DIH is not included in our regression models. This suggests that our main results, that greater institutional ownership is associated with less post-earnings-announcement drift, are likely to be generalizable to other samples and periods.

Panel B of Table 4 reports the results for the replication of our augmented-regression tests using book-to-market-adjusted returns, BAR12 and BCAR60, rather than size-adjusted returns, AR12 and CAR60, as dependent variables. The results of this replication for BAR12 are nearly identical to those of our original regression using AR12 (reported in Panel A of Table 3). The results for BCAR60 are also very similar to the results for CAR60 (reported in Panel B of Table 3), with one exception: the estimated coefficient of DSUE*DMV that was insignificant in the original regression becomes significantly negative. The most important aspect of the results in Panel B of Table 4 is that our main finding is not sensitive to the way we measure abnormal returns; both the sign and the statistical significance of the estimated coefficient of DSUE*DIH are quite similar across the original regressions and the replication. For example, when CAR60 is the dependent variable, the estimated coefficient of DSUE*DIH is −6.62, with a t-statistic of −8.73 (see, Panel B of Table 3), and when BCAR60 is the dependent variable (reported in Panel B of Table 4), the estimated coefficient of DSUE*DIH is −4.99, with a t-statistic of −6.64.

Finally, Panel C of Table 4 displays the results for the replication of our regression tests using book-to-market- and size-adjusted returns, BZAR12 and BZCAR60. Again, the results are very similar to the original results reported in Table 3. Together, the results in Panels B and C indicate that our findings are robust to alternative measures of expected returns.

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[14] Results in Bhushan (1994, Table 5, Panel A) show that both the trading volume variable and the share price variable are significant in explaining AR12. Bhushan's (1994, Table 5, Panel B) results for long-window abnormal returns, however, are insignificant for the trading volume variable and only mixed for the share price variable.

Institutional Investors Holdings and Perceptions of the Earnings Process

In this section we assess the validity of institutional holdings as a proxy for investor sophistication. If IH is a reasonable proxy for investor sophistication, IH will distinguish between firms whose stock price reflects unsophisticated (random walk) earnings expectations and firms whose stock price reflects sophisticated (Brown-Rozeff) expectations. We

TABLE 4
Sensitivity Tests of Stock Return Behavior after Earnings Announcements

Panel A: Transaction Costs and Size-Adjusted Stock Return Behavior after Earnings Announcements: Replication of Earlier Study (Bhushan 1994)

Model: $AR12_{i,t} = k + b_1\, DSUE_{i,t} + b_2\, DSUE_{i,t} * DMV_{i,t} + b_3\, DSUE_{i,t} * BPRC_{i,t} + b_4\, DSUE_{i,t} * \mathrm{QVOL}_{i,t} + error_{i,t}$

		Dependent Variable = AR12 (n = 19,777) (Adj. R^2 = 1.2%)			*Bhushan (1994, Table 5, 60) Dependent Variable = AR12 (n = 73,966) (Adj. R^2 = 1.2%)*		
	Expected sign	*Coefficient*	*t-statistic*	*Alternative t-statistic*[a]	*Coefficient*	*t-statistic*	*Alternative t-statistic*[a]
Intercept	?	0.57	3.08*	2.34*		Not reported	
DSUE	+	2.75	5.09*	2.14*	4.81	27.61*	9.31*
DSUE*DMV	?	1.52	1.67	−1.63	0.35	1.02	−0.83
DSUE*BPRC	−	−1.01	−1.85	−1.17	−1.32	−5.50*	−3.76*
DSUE*QVOL	−	−2.75	−3.05*	−2.11*	−2.56	−8.75*	−3.86*

Panel B: Institutional Holdings, Transaction Costs, and Book-to-Market-Adjusted Stock Return Behavior after Earnings Announcements

Model: $Abnormal\ Returns_{i,t} = k + b_1\, DSUE_{i,t} + b_2\, DSUE_{i,t} * DIH_{i,t} + b_3\, DSUE_{i,t} * DMV_{i,t} + b_4\, DSUE_{i,t} * BPRC_{i,t} + b_5\, DSUE_{i,t} * QVOL_{i,t} + error_{i,t}$

		Dependent Variable = BAR12 (n = 18,026) (Adj R^2 = 1.1%)			*Dependent Variable = BCAR60 (n = 18,026) (Adj. R^2 = 1.5%)*		
	Expected sign	*Coefficient*	*t-statistic*	*Alternative t-statistic*[a]	*Coefficient*	*t-statistic*	*Alternative t-statistic*[a]
Intercept	?	0.23	1.66	1.31	−3.67	−17.04*	−7.40*
DSUE	+	1.44	3.36*	2.19*	5.79	8.79*	4.56*
DSUE*DIH	−	−1.39	−2.84*	−2.71*	−4.99	−6.64*	−3.54*
DSUE*DMV	?	0.31	0.45	0.73	−4.32	−4.07*	−2.17*
DSUE*BPRC	−	−0.22	−0.53	−0.50	0.24	0.37	0.51
DSUE*QVOL	−	−0.44	−0.62	−0.82	4.03	3.67	2.48

(*Continued on next page*)

TABLE 4
(Continued)

Panel C: Institutional Holdings, Transaction Costs, and Book-to-Market- and Size-Adjusted Stock Return Behavior after Earnings Announcements

Model: $Abnormal\ Returns_{i,t} = k + b_1\ DSUE_{i,t} + b_2\ DSUE_{i,t} * DIH_{i,t} + b_3\ DSUE_{i,t} * DMV_{i,t} + b_4\ DSUE_{i,t} * BPRC_{i,t} + b_5\ DSUE_{i,t} * QVOL_{i,t} + error_{i,t}$

		Dependent Variable = BZAR12 *(n = 18,013)* *(Adj. R^2 = 1.1%)*			*Dependent Variable = BZCAR60* *(n = 18,013)* *(Adj. R^2 = 1.5%)*		
	Expected sign	*Coefficient*	*t-statistic*	*Alternative t-statistic*[a]	*Coefficient*	*t-statistic*	*Alternative t-statistic*[a]
Intercept	?	0.32	2.09*	1.60	−3.29	−14.05*	−5.04*
DSUE	+	1.21	2.58*	2.02*	2.55	3.56*	2.67*
DSUE*DIH	−	−1.44	−2.68*	−2.99*	−4.77	−5.81*	−2.61*
DSUE*DMV	?	0.67	0.89	1.42	−0.01	−0.01	0.52
DSUE*BPRC	−	−0.35	−0.77	0.81	0.47	0.66	1.12
DSUE*QVOL	−	−0.30	−0.38	−1.12	5.31	4.45	4.04

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* Indicates that the coefficient is statistically significant at an alpha of 5 percent (one-tailed when the coefficient sign is predicted).

[a] The alternative t-statistic is computed by first estimating the regression for each quarter separately, and then dividing the time-series mean estimate of the coefficient by its time-series standard deviation.

All variables are defined Tables 2 and 3.

examine the construct validity of IH by regressing the three-day cumulative abnormal stock returns around earnings announcements ($CAR3_{i,t}$) on current ($DSUE_{i,t}$) and lagged ($DSUE_{i,t-1}, \ldots, DSUE_{i,t-4}$) quarterly earnings surprises in subsamples that have different levels of IH. In particular, we run the following regression model across subsamples with low and high levels of institutional ownership:

$$CAR3_{it} = k + b_1\ DSUE_{it} + b_2\ DSUE_{i(t-1)} + b_3\ DSUE_{i(t-2)} + b_4\ DSUE_{i(t-3)} + b_5\ DSUE_{i(t-4)} + error_{it}. \qquad (3)$$

If IH is a reasonable proxy for investor sophistication, the estimate of b_1 in equation (3) will be significantly positive and the other parameter estimates will be zero in the subsample of firms with low institutional holdings (low IH). This prediction presumes that the stock price reaction to the earnings announcement of firms with low IH is determined primarily by unsophisticated investors who expect earnings to be the same as the same quarter in the prior year, totally unaware of the serial correlation in SUE. Consequently, the price reaction to the earnings announcement of quarter t will be completely explained by $DSUE_{it}$ and the coefficients on the lagged DSUEs should be close to zero because investors react only to current earnings changes and ignore their predictability from past earnings changes. Conversely, for a subsample of firms with high institutional holdings (high IH) the stock price reaction to the earnings announcement is determined primarily by sophisticated investors who are informed about the earnings process and thus are aware of the serial correlation in SUE. In this case the estimates of b_1 and b_5 should be significantly positive and the estimates of b_2, b_3, and b_4 should be significantly negative because the stock price reaction is an increasing function of the earnings surprise, and thus a decreasing function of expected earnings, which are positively related to $DSUE_{i(t-1)}$, $DSUE_{i(t-2)}$, and $DSUE_{i(t-3)}$, and negatively related to $DSUE_{i(t-4)}$.[15]

Table 5 reports the regression results of estimating equation (3) for the sample as a whole and for the two subsamples. Like the Ball and Bartov results (1996, Table 3, Panel A), our full sample results indicate that the estimates of b_1 and b_5 are significantly positive, and the estimate of b_4 is significantly negative. Unlike the Ball and Bartov (1996) results, ours indicate that the estimates of b_2 and b_3 are statistically insignificant. The insignificance of these coefficients' estimates in Table 5 may be due to the reduced power that stems from our smaller sample. While the similarities and dissimilarities between our full sample results in Table 5 and those in Ball and Bartov (1996) are noteworthy, they are not the most important aspects of Table 5 with respect to assessing the construct validity of IH as a proxy for investor sophistication. This assessment is based upon the results of comparing a subset of the regression parameters in the low- and high-IH subsamples.

When reviewing the results in Table 5, it is important to note that the coefficient of $DSUE_t$ does not play a diagnostic role in determining whether IH is a reasonable proxy for investor sophistication. This is because the coefficient of $DSUE_t$ is expected to be positive in both the low- and high-IH subsamples. As expected, the results in Table 5 indicate that the coefficient of $DSUE_t$ is significantly positive in both the low- and high-IH subsamples. It is the coefficients' estimates on the lagged DSUE terms that provide evidence on the appropriateness of IH as a proxy for investor sophistication. The results in Table 5 reveal that the coefficients' estimates are consistent with the view that the stock price reaction of low-IH firms largely reflects the actions of unsophisticated investors. Specifically, three of the four coefficients' estimates on the lagged DSUE terms are statistically insignificant.[16] Conversely, within the high-IH group, three of the four coefficients' estimates on the lagged DSUE terms are significant in the predicted direction. These tests of the significance of individual coefficients' estimates within each subsample provide evidence that IH is a reasonable proxy for investor sophistication. However, the last column of Table 5, which reports the results of tests for differences in coefficients' estimates on the lagged DSUE terms across the two subsamples, provides more mixed support for the construct validity of IH as a proxy for investor sophistication. In particular, none of the individual t-tests of the difference in the coefficients' estimates on the lagged DSUE terms across the low- and high-IH groups are significant, while the alternative z-statistics reveal that the coefficients' estimates of $DSUE_{t-1}$ and $DSUE_{t-4}$ are significantly different in the direction consistent with IH being a reasonable proxy for investor sophistication. Overall, we interpret the evidence in Table 5 as being moderately supportive of the construct validity of IH as a

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[15] For more details on the intuition underlying these predictions, as well as their formal derivations, see Ball and Bartov (1996, 323–325).

[16] The only result within the low-IH subsample that raises some concern about the appropriateness of IH as a proxy for investor sophistication is the significantly negative estimated coefficient of $DSUE_{t-3}$ (−0.59, with an alternative t-statistic of −3.47).

TABLE 5
Institutional Investor Holdings and Perceptions of the Earnings Process

Model: $CAR3_{i,t} = k + b_1\, DSUE_{i,t} + b_2\, DSUE_{i,t-1} + b_3\, DSUE_{i,t-2} + b_4\, DSUE_{i,t-3} + b_5\, \mathrm{DSUE}_{i,t-4} + error_{i,t}$

		Full Sample $n = 13822$[a] *Adj.* $R^2 = 3.09\%$			*Low IH*[b] $n = 4146$ *Adj.* $R^2 = 3.19\%$			*High IH*[b] $n = 4146$ *Adj.* $R^2 = 2.73\%$			*Test for Difference in Coefficients between Low and High IH*	
	Expected Sign	*Coefficient*	*t-statistic*	*Alternative t-statistic*[c]	*Coefficient*	*t-statistic*	*Alternative t-statistic*[c]	*Coefficient*	*t-statistic*	*Alternative t-statistic*[c]	*t-statistic*[d]	*Alternative z-statistic*[e]
Intercept	?	−0.81	−6.40*	−5.11*	−1.43	−4.65*	−0.27	−0.57	−2.96*	−2.91*	NR[f]	NR[f]
DSUE_t	+	3.23	20.65*	9.89*	3.98	11.35*	9.16*	2.71	10.73*	9.37*	NR[f]	NR[f]
DSUE_{t-1}	−	−0.63	−3.91*	−1.32	−0.61	−1.24	0.31	−0.81	−3.04*	−3.17*	−0.46	−2.67*
DSUE_{t-2}	−	−0.22	−1.38	−1.62	0.19	0.55	0.88	−0.36	−1.35	−0.26	−1.24	0.48
DSUE_{t-3}	−	−0.61	−3.77*	−3.02*	−0.59	−1.68*	−3.47*	−0.62	−1.98*	−2.14*	−0.60	1.49
DSUE_{t-4}	+	0.53	3.45*	3.04*	0.77	1.11	0.86	0.57	1.92*	2.63*	−0.47	2.39*

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* Indicates that the coefficient is statistically significant at an alpha of 5 percent.

[a] The observations (13,822) are less than in Table 1 (19,777) because four previous quarterly SUEs are required for the analysis reported here.

[b] The low- (high-) IH group is the bottom (top) 30 percent of the quarterly observations based on the percentage of common shares held by all institutions at the beginning of the quarter in which the earnings announcement is made.

[c] The alternative t-statistic is computed first by estimating the regression for each quarter separately, and then by dividing the time-series mean estimate of the coefficient by its time-series standard deviation.

[d] The t-statistic for testing the difference between the coefficients on current and lagged SUEs between the high- and low-IH groups is based upon a pooled regression that includes interaction terms for each SUE and IH group membership.

[e] The alternative z-statistic for testing the difference between the coefficients on current and lagged SUEs between the low- and high-IH groups is computed by first estimating separate regressions for each quarter and each IH group and then conducting a Wilcoxon test of whether the median coefficient on each SUE is different between the low- and high-IH groups.

[f] NR indicates that the test for differences in coefficients across the low- and high-IH groups was not conducted because it was not relevant to assessing whether IH is a constructively valid measure of investor sophistication.

All variables are defined in Tables 2 and 3.

measure of investor sophistication.[17] However, the relatively weak results for some of the tests conducted here suggest the need for more research that investigates the construct validity of institutional holdings as a proxy for investor sophistication.

V. CONCLUDING REMARKS

Does the percentage of a firm's shares held by institutional investors, a variable used by prior research to proxy for investor sophistication, relate to post-earnings-announcement drift? Our primary finding is that post-earnings-announcement drift is related to the percentage of ownership of institutional investors and that this relation exists even when transaction costs and firm size are controlled.

This finding is related to Walther (1997), who examined whether the extent to which the market relies on analysts' earnings forecasts rather than on seasonal random-walk (SRW) model forecasts in pricing stocks is related to the level of investor sophistication.[18] Walther (1997) reports the results of regressing returns around earnings announcements on unexpected-earnings metrics where expected earnings is based on analysts' earnings forecasts and on SRW model forecasts. She uses the percentage of stock held by institutional investors as a proxy for the likelihood that the marginal investor is sophisticated. Walther (1997) hypothesized and found that the weight on analysts' forecasts increased and that on SRW model forecasts decreased as the likelihood that the marginal investor was sophisticated increased. Walther's (1997) results do lend support to the idea that institutional holdings are a reasonable proxy for investor sophistication, but her results do not address the issue of whether post-earnings-announcement drift is related to the level of institutional holdings—the question of primary interest in this study. Prior research demonstrates that analysts do not fully utilize available information efficiently when setting earnings forecasts.[19] Consequently, Walther's (1997) results that stock price responses to earnings announcements place a larger weight on analysts' forecast errors when institutional holdings are high does not necessarily mean that there will be less post-earnings-announcement drift when institutional holdings are high.

The evidence in this study indicates that the degree of inefficient pricing as manifested in the amount of drift in abnormal security returns subsequent to quarterly earnings announcements is related to the proportion of a firm's stock held by institutions. We interpret this evidence to mean that institutional investors improve on the earnings-processing problems that cause post-earnings-announcement drift and increase the degree to which earnings information is efficiently priced.

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[17] It is arguable that the differences between the low- and high-IH subsamples in the results in Table 5 do not represent differences in the misperceptions of the earnings process by sophisticated and unsophisticated investors. Rather, the results could follow because the earnings processes of firms within the low-IH subsample are different than the earnings processes of firms within the high-IH subsample. In tests not reported in a table (for parsimony), we investigate this alternative explanation by regressing DSUE_t on the four lagged values of DSUE separately for the low- and high-IH subsamples. We found that the earnings processes within each subsample are nearly statistically indistinguishable. The only exception is that the estimated coefficient on DSUE_{t-1} in the high-IH subsample is significantly larger than in the low-IH subsample. This evidence does not support the alternative explanation for the results in Table 5 that the earnings processes of firms within the low-IH subsample are different than the earnings processes of firms within the high-IH subsample.

[18] In addition to the institutional percentage of a firm, Walther (1997) also used the number of institutions holdings shares, the number of analysts, and firm size as alternative proxies for the likelihood that the marginal investor is sophistication. Only institutional percentage and number of analysts, however, consistently generated significant results.

[19] Mendenhall (1991), Abarbanell and Bernard (1993), Ali et al. (1992), and Abarbanell and Bushee (1997) document that analysts underestimate the persistence of earnings surprises when revising their earnings forecasts. Klein (1990) and Abarbanell (1991) show that analysts underreact to prior period stock price behavior.

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An Empirical Investigation of an Incentive Plan that Includes Nonfinancial Performance Measures

Rajiv D. Banker
University of Texas at Dallas
Gordon Potter
Cornell University
Dhinu Srinivasan
University of Pittsburgh

ABSTRACT: Recent studies report an increasing use of nonfinancial measures such as product quality, customer satisfaction, and market share in performance measurement and compensation systems. A growing literature suggests that because current nonfinancial measures are better predictors of long-term financial performance than current financial measures, they help refocus managers on the long-term aspects of their actions. However, little empirical evidence is available on the relation between nonfinancial measures and financial performance, and even less is known about performance impacts of incorporating nonfinancial measures in incentive contracts. Using time-series data for 72 months from 18 hotels managed by a hospitality firm, this study provides empirical evidence on the behavior of nonfinancial measures and their impact on firm performance. The results indicate that nonfinancial measures of customer satisfaction are significantly associated with future financial performance and contain additional information not reflected in the past financial measures. Furthermore, both nonfinancial and financial performance improve

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following the implementation of an incentive plan that includes nonfinancial performance measures.

Key Words: *Nonfinancial performance measures, Performance evaluation, Incentive plans, Customer satisfaction, Executive compensation, Hospitality Industry.*

Data Availability: *The confidentiality agreement with the firm that provided data for this study precludes revealing its identity and disseminating data without its written consent.*

I. INTRODUCTION

Many firms now use nonfinancial measures such as product quality, customer satisfaction and market share to evaluate and reward managerial performance (Ittner et al. 1997). The primary reasons suggested for the use of nonfinancial performance measures are that these measures are better indicators of future financial performance than accounting measures, and they are valuable in evaluating and motivating managerial performance.[1] To date, however, there have been very few studies on the relation between nonfinancial measures and financial performance, and the empirical evidence provided by these studies has been mixed (Ittner and Larcker 1998b, 218). In addition, although there have been calls for greater emphasis on nonfinancial measures in internal performance measurement systems (Kaplan and Norton 1996) and firms have implemented such systems, virtually no evidence exists on the impact of including nonfinancial measures in performance evaluation and incentive compensation (Ittner and Larcker 1998b). Using time-series data from a number of lodging properties managed by a firm that implemented an incentive system based on nonfinancial and financial performance measures, this study provides empirical evidence on two research questions: (1) Are (some) nonfinancial performance measures leading indicators of financial performance? (2) Does the adoption of an incentive compensation plan that increases the emphasis on nonfinancial performance measures for key managers of a firm lead to improvements in both financial and nonfinancial performance? The analysis reveals that nonfinancial measures of customer satisfaction are related to future financial performance, and that both financial and nonfinancial performance improve following the implementation of an incentive plan that includes nonfinancial measures of performance.

Traditionally, firms have measured and rewarded managerial performance using financial measures such as earnings, return on investment, or unit costs (Eccles 1991). Recently, there has been an increased emphasis on nonfinancial measures such as customer satisfaction, employee satisfaction, productivity, product quality, and market share in compensating managers. For example, Chrysler Corporation paid bonuses to its 200 top executives based on the attainment of vehicle quality and customer satisfaction targets in addition to measures of profitability (Lavin 1994, A3). Ford Motor Company recently announced an executive compensation plan, similar to the plans used by General Motors and Chrysler, that includes nonfinancial customer satisfaction and operational measures (*New York Times* 1998).[2]

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[1] The argument that nonfinancial measures are better indicators of future financial performance is based on cause-and-effect. An implicit assumption is that managerial actions result in outcomes such as innovation, quality, or customer satisfaction which, in turn, drive future financial performance (Kaplan and Norton 1992, 71; Hauser et al. 1994, 330). However, current financial measures do not reflect the value of these long-term-oriented managerial actions. Therefore, nonfinancial measures of performance are useful to help refocus managers on the long-term aspects of their actions (Hemmer 1996, 87–88).

Several reasons have been suggested to explain why nonfinancial measures are used to augment financial measures in management control. Nonfinancial measures are believed to complement short-run financial figures as indicators of progress toward a firm's long-term goals (American Accounting Association 1971, 181; Johnson and Kaplan 1987, 259). Current profit and other financial measures only partially reflect the effects of past and current activities, whereas nonfinancial measures of customer satisfaction, internal process improvements, and an organization's innovation and improvement activities reflect the effect of current managerial actions that will not show up in financial performance until later (Kaplan and Norton 1992, 71; Singleton-Green 1993, 52).[3] The use of nonfinancial measures for performance evaluation is also consistent with theoretical work on compensation in agency settings. Because financial measures of performance may be imperfect and noisy signals of a manager's effort, nonfinancial measures can add value by inducing long-run focused effort (Feltham and Xie 1994, 442; Hemmer 1996, 97; Joseph et al. 1999).

A principal justification for the use of nonfinancial performance measures is that they are leading indicators of financial performance. Two surveys (Ittner and Larcker 1998b, 218; Arthur Andersen & Co. 1994) suggest that many firms did not find a significant association between customer satisfaction and accounting or market returns. Using cross-sectional annual data from 77 Swedish firms from diverse industries, Anderson et al. (1994, 1997) found that, on average, customer satisfaction is positively associated with contemporaneous ROI, but found weaker or negative associations in service firms. Ittner and Larcker's (1998a) analyses based on customer and business-unit level data for two service firms indicate that customer satisfaction measures are positively related to future financial performance. However, their firm-level analysis of cross-sectional data did not find consistent associations between customer satisfaction and market returns. Time-series data can help overcome some potential shortcomings such as omitted variables, endogeneity and spurious correlation associated with analyses based on cross-sectional data. One possible explanation for the mixed findings in previous research is that these studies have relied on short time series (the number of longitudinal observations is less than or equal to four) to detect a lead-lag relation between customer satisfaction and economic performance. Our research setting with more than 60 time-series observations per business unit provides a greater statistical power to detect such a relation. Moreover, unlike previous studies that assume the lag period (such as a quarter, six months, or a year) because of data limitations, we are able to explore the timing of the lead-lag relation based on a statistical search.

Despite an increasing use of nonfinancial measures in managerial compensation (Ittner et al. 1997), there is little empirical evidence of the performance impacts of such plans. Incentive plans that include nonfinancial measures can affect financial performance either directly, or indirectly by improving nonfinancial performance which then impacts financial performance. Although prior empirical studies have documented the performance impact of including financial measures in incentive plans (Wagner et al. 1988; Banker et al. 1996), empirical support for the hypothesized performance impacts of including nonfinancial measures in compensation plans is at best weak (Ittner and Larcker 1998b, 220). Ittner et al. (1997) analyzed the determinants of the use of nonfinancial measures in CEO compensation, but did not examine the performance impacts of such compensation plans. Symons and Jacobs' (1995) study of a TQM-based reward system for production workers found that operational performance improved, but it did not examine the effects on financial performance. Using cross-sectional survey data, two studies found that self-reported use of manufacturing measures by managers had a positive impact on perceived performance in some manufacturing settings but not in others (Ittner and Larcker 1995; Abernethy and Lillis 1995). A similar study found no such evidence (Perera et al. 1997). None of these survey studies report the explicit use of nonfinancial measures in managerial compensation. Our study is the first to analyze longitudinal archival data both before and after a change in an incentive plan using an event-study design to provide empirical evidence on the financial effects of incorporating nonfinancial measures in incentive contracts.

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[2] Ittner et al. (1997, 238) report that 36 percent of the companies surveyed in their study use nonfinancial measures in executive compensation. For details on the various studies that report increasing use of nonfinancial measures in compensation, the reader is referred to *Journal of Accountancy* (1993, 17), and Hauser et al. (1994, 328). Other studies of Japanese and British companies also indicate increasing use of nonfinancial measures in performance measurement (Hiromoto 1988, 26; Rees and Sutcliffe 1994, 334).

[3] Other reasons suggested for the use of nonfinancial measures are that they are less susceptible to manipulation, more timely and more easily understood (Singleton-Green 1993, 52; Rees and Sutcliffe 1994, 332). However, others note that nonfinancial measures are not audited and may be more easily manipulated than financial measures (Ittner et al. 1997, 236). Competitive pressure is another reason why firms have started focusing on quality and customer responsiveness (Eccles 1991, 132; Hall 1993, 3). Our focus is on whether current nonfinancial measures allow prediction of future performance and how incorporating current nonfinancial measures into executive compensation plans impacts a firm's subsequent performance.

The rest of the paper is organized as follows. The research site and data collection methods are described in Section II. Estimation models are developed in Section III and results are presented in Section IV. Concluding remarks are offered in Section V.

II. RESEARCH SITE, INCENTIVE PLAN, AND DATA COLLECTION

Research Site

The research site for this study is a hotel chain (hereafter referred to as HOTELCORP) operated by the hospitality division of a multi-billion dollar privately held conglomerate providing travel-related and other business services. During the period of this study, the hotel chain franchised more than 200 hotels and directly managed over 20 hotels. The hotels are located all over the world, but the focus of this study is on the managed hotels of HOTELCORP located within the United States. The research site was chosen for access to its senior managers and, more importantly, for availability of comparative data for a control group of franchised hotels and competitors that enables us to estimate the relation between financial and nonfinancial performance and isolate the performance impact of the incentive plan. Senior managers were motivated to participate in the study because they were unsure of how (or if) nonfinancial measures were related to future financial performance and were interested in identifying the impact of the incentive plan based on nonfinancial measures on firm performance.

The managed hotels vary in size, with the number of available rooms ranging from 150 to 450. Many of the hotels are rated as four-star and are classified as lower upscale hotels that include hotels like Crown Plaza, Radisson, Hilton and DoubleTree. The managed hotels offer full service. Most of the managed hotels of HOTELCORP cater largely to business travelers. The managed hotels are homogeneous in many important aspects of their operations like the incentive system, organizational structure, clientele, and infrastructure. Interviews with senior managers suggested little differences in these and other endogenous factors between the managed hotels that may influence financial performance. However, there are differences between the managed hotels in terms of exogenous factors like geographic location and competition.

Incentive Plan

Nearly two-thirds of the hotel industry uses some form of incentive pay for its managers and over one-half uses some kind of bonus program for their hourly employees. The maximum bonus ranges between 30 and 70 percent of the base salaries for managers (Kefgen 1996, 34). A large percentage of the business in the hotel industry is from repeat customers and hence customer service is a very important aspect of this industry. To increase customer loyalty and repeat customer business, hotels have abandoned the price pitch and embraced value through customer satisfaction (Fisher 1993, 26). Reliance on customer satisfaction and related nonfinancial measures in the incentive pay is a recent phenomenon (Schlesinger and Heskett 1991, 72; *Restaurants and Institutions* 1992, 27). An internal survey conducted by the hotel chain indicated that in the early 1990s hotel chains such as Hyatt, Marriott, and Hilton had implemented incentive programs for their senior managers based on profit and nonfinancial measures such as quality of rooms and food, safety, guest satisfaction, employee satisfaction, and other specific objectives. The incentive programs at major hotel chains differed in target setting, maximum bonus as a percentage of salary, and weights placed on financial and nonfinancial performance measures, but all of them emphasized the importance of nonfinancial measures. These practices underscored the belief of senior managers at the research site that, in the long run, a satisfied customer is an asset that makes the firm more profitable. The senior managers also believe that a customer-focused strategy is essential not only for the long-term profitability of an individual hotel, but also for enhancing the hotel chain's brand value. HOTELCORP introduced its new incentive plan for key managers at each managed property in 1993 with the objective of rewarding employees for meeting the key objectives of owners' satisfaction (profitability) and customer satisfaction as outlined in its mission statement.

A detailed review of internal documents at the research site indicated that prior to 1993, individual hotel managers' compensation included a base salary and a bonus based on financial measures such as operating profit, revenues, or costs. The bonus paid to a manager was bounded above by a percentage of the base salary, where the bound depended on rank in the organization and eligibility. The human resource manager at our research site remarked that actual bonus paid as a percentage of salary was below industry standards. For example, the general manager of a hotel could earn up to 20 percent of his base pay as bonus by achieving profit goals. In addition, a portion of the bonuses of key managers within a hotel was based on individual performance measures for his area of responsibility. For example, while operating profit was the basis for a major component of bonus, up to 15 percent of the general manager's bonus was based on subjective evaluation (resulting in a total bonus equal to 35 percent of the base salary), up to 5 percent of the chief engineer's bonus was based on energy costs and up to 10 percent of the sales director's bonus was based on room revenues. Although customer satisfaction measures were tracked, they were not used explicitly for incentive purposes. With the dual objective of keeping in line with competitors in the hotel industry, and focusing and directing the efforts of managers on key company objectives, the hotel chain introduced an incentive plan based on operating profit and nonfinancial measures. A senior manager remarked to us:

> Back in the early nineties we were an okay management company but we weren't exactly producing industry-leading results....By instituting (the plan) we actually gave people a reason to worry about the customer satisfaction side and a way to share in the greater portion of whatever they drove to the bottom line....

The new incentive plan was developed by a cross-functional team of regional vice presidents and corporate executives representing functions such as human resources, marketing, planning, and operations. "The Service-Profit Chain" (Heskett et al. 1994), where internal service quality adds to the service value, resulting in loyal and satisfied customers which, in turn, leads to revenue growth and profit, was the guiding principle of the senior management in the development of the new incentive plan. In the words of one of the senior managers:

> ...well satisfied customers in the end is the only way to realize sustained growth and profitability...you can always attract new customers, but if your old customers are falling out of the bottom because of lax service, you have a problem...you really need to build a base of satisfied and loyal customers, and find new ones along the way....

The team identified both financial and nonfinancial measures of performance based on the strategic objective of satisfying two constituencies—owners and guests of the hotel. The new managerial bonus plan for all managers of individual hotels can be approximated by a linear contract based on hotel profit, revenue contribution from toll-free lines and two nonfinancial measures: likelihood of return and customer complaints. The senior manager in charge of the division indicated that the weights on the financial and nonfinancial measures were chosen based on a consensus agreement among the senior managers. He stated:

> I'd like to tell you that we looked at it very statistically but I think what we really did was to sit around as a broad group and came to some type of consensus...we didn't want to skew it to just the operating profit because in essence all things you do to maximize cash flows may damage the future...what we tried was to have a "balanced-scorecard" if you may use the term....

Measurement of the variables and the reasons for their inclusion in the incentive plan are described later. We are unable to disclose the specific details of the new incentive plan because of our confidentiality agreement. Base salaries of managers did not change under the new incentive plan. The new incentive plan differs from the old plan in three aspects: (1) the new plan relies on performance measures (both financial and nonfinancial) common to all managers as opposed to the old plan that relied on individual performance measures (mainly financial), (2) the new plan explicitly incorporates nonfinancial measures with specific weights on each measure, and (3) the new plan increases the maximum eligible bonus for some managers by increasing the bonus rate applied to the base salary,[4] with a large proportion of eligible bonus based on nonfinancial measures. However, the new incentive plan continues to use current operating profit as the financial performance measure and provides the same (or slightly lower) level of incentives for achieving operating profit goals as the old plan. Managers can earn the maximum eligible bonus only if both financial and nonfinancial targets are attained and can earn only about a third of eligible bonus if only the financial (operating profit) targets are attained.[5] In summary, the new incentive plan can be best described as a reward system that maintained the same (or less) emphasis on current financial performance as the old plan, but one that encouraged attainment of nonfinancial objectives by providing specific, higher incentives based on those measures.

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[4] The new incentive plan provides the same maximum bonus eligibility as the old plan for most managers, with the exception of the general manager and controller who have higher maximum bonus than before. The general manager can now earn a maximum bonus of 50 percent of his base salary compared to 35 percent before. The controller can now earn a maximum bonus of 40 percent of his base salary compared to 30 percent before.

[5] For example, although the general manager can now earn up to 50 percent of his base salary as bonus, achieving only the operating profit goals will earn him one-third of the maximum bonus (or 17 percent of the base salary). The remaining two-thirds of the maximum bonus (or 33 percent of the base salary) is earned only if nonfinancial goals are achieved. Recall that under the old plan, the general manager received 20 percent of the base salary as bonus for achieving operating profit goals and 15 percent of the base salary as bonus based on subjective evaluation. Under the new plan, other hotel managers receive lower bonuses based only on operating profit goals compared to the old plan because the maximum bonus as a percentage of base salary remains the same for these managers.

Documents detailing the guiding principles, design framework, and incentive plan structure were circulated to all managers. In addition, meetings were conducted to explain the objective of the incentive plan and details such as target setting and payouts of the incentive plan. General managers of the hotel were asked to submit their target goals that required approval by the senior management. A senior manager in charge of the division indicated that goals were benchmarked based on the performance of the best hotels in the chain and on the performance of competitors. The new incentive plan was introduced at all managed hotels of the chain. The hotel chain does not control the human resource management function at franchised hotels, and, hence, the franchised hotels were not affected by the changes in the incentive plan. The incentive plan was implemented in July 1993 for all managed hotels. Hotel managers were informed in April 1993 that a proposal to introduce an incentive plan was being considered by senior management. However, the details of the plan were revealed to hotel managers only in June 1993. Therefore, in testing the impact of the incentive plan, alternative event dates, April and July 1993, are considered for the start of the incentive plan.

Data Collection

Monthly data were obtained for a period of up to 72 months (beginning with January 1991) for the 18 hotels managed by HOTELCORP. Sales, expense, and profit data for the individual hotels were electronically collected from the general ledgers maintained at its corporate headquarters. These and hand-collected data on nonfinancial measures and competitors' comparative data were cross-checked with aggregate financial and summary statements, and later verified by company staff to eliminate any data entry errors. Company documents and interviews with senior managers and corporate staff provided qualitative data on their beliefs and expectations about the incentive plan. In addition, general managers of two hotels were interviewed to understand hotel operations and obtain their views about effort reallocation in response to the new incentive plan.

Financial Performance Measures

Operating profit is the financial performance measure included in the plan to motivate managers to improve owners' satisfaction. Similar to other hotel companies, HOTELCORP allows bonuses only when a threshold level of operating profit is achieved. Operating profit per available room (PROFIT) is computed as revenues per available room (REVENUE) from rooms, food, beverage, and other activities like telephone and movies, less expenses per available room (COST) for these activities and other overhead expenses such as energy, operations and maintenance, human resources, and marketing. Hotel managers are not held responsible for capital investment decisions and fixed expenses like insurance, lease rental, and property taxes. The use of this measure of operating profit reflects HOTELCORP's philosophy that "measurements must reflect the manager's effectiveness." Each hotel's operating profit is measured and reported using a uniform system of accounts for the hotel industry (Hotel Association of New York, Inc. 1986). Individual hotel revenues and operating costs are the other financial performance measures considered in our analysis. Revenue per available room (REVENUE) is a widely used benchmark in the hotel industry. This measure can be partitioned multiplicatively into a rate (price) component, Average Rate (AVGRATE), measured as revenues divided by the number of occupied rooms, and a volume component, Occupancy Rate (OCCRATE), measured as the number of occupied rooms divided by the number of available rooms. Availability of data on available and occupied rooms of all individual hotels enables the use of these component measures in our analysis.

Contribution from Toll-Free Lines (TOLLRES). Another financial measure used in the incentive plan is based on the revenue contribution from toll-free lines. The hotel chain operates a centralized reservation system for its franchised and managed hotels. Customers and travel agents can call the reservation center through toll-free lines. Hotel managers influence the occupancy rates and room revenues by setting room prices and making rooms available for the reservation center, direct bookings, and walk-ins. Past experience at HOTELCORP indicated that net room rates were higher for direct toll-free reservations. Increasing direct reservations through toll-free lines also means employing fewer sales and reservation agents at the individual hotels, and, hence, is expected to lead to lower operating costs. HOTELCORP management included this measure in the incentive plan also because the percentage of reservations through the center is used as a signal to attract prospective franchisees. Although HOTELCORP labels TOLLRES as a nonfinancial measure, it is computed as a ratio of two current financial measures: the room revenues booked in a month through the reservation center and the total room revenues realized in that month. Based on the beliefs of the senior management, we expect this measure to be contemporaneously associated with revenues, operating costs, and profit.

Nonfinancial Performance Measures

Likelihood of Return (LRETURN). Customer satisfaction is considered a key short-term measure that is a lead indicator of long-term performance (Anderson and Sullivan 1993, 125; Hauser et al. 1994, 330). In evaluating customer satisfaction, many hotels employ a weighted index of customer satisfaction based on a number of questions.[6] The incentive plan at HOTELCORP uses a measure based only on the response to one key question on the comment cards filled out by hotel guests which asks how likely it is that a guest will return. Senior managers believe that this question best captures the intent of customers to provide repeat business. Likelihood of return (LRETURN) is computed as the percentage of customer responses with the two highest (out of five) ratings. Hotel managers can take a number of actions pertaining to the operations of the hotel to improve this measure including price concessions and delivering amenities to the rooms. However, such extra steps may lead to an increase in operating costs.

Customer Complaints (COMPLNTS). The number of customer complaints is another measure of customer satisfaction. Billing errors, service catastrophes, and problems with service personnel are some of the prime reasons for customer switching behavior (Keaveney

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[6] HOTELCORP also computes for each hotel a monthly composite index of customer satisfaction (CSINDEX) based on customer responses to a number of questions that cover various aspects of customer service such as front desk encounters, cleanliness of rooms, quality of food and beverage services, and general upkeep of the hotel. However, this measure is not used for incentive purposes because the senior management wanted to use a simple measure of customer satisfaction in the incentive plan and they were also uncertain about how customer satisfaction measured on these dimensions translates into repeat business. Although not reported in the paper, the regression results based on CSINDEX indicate that the relationship between this alternative measure of customer satisfaction and financial performance is very similar to the relationship between LRETURN and financial performance. The R^2 values for the two sets of regressions are very similar, suggesting that the explanatory power of the two different measures of customer satisfaction is nearly the same. In addition, the regression results of the models using both these measures as independent variables suggest that CSINDEX does not have any explanatory power over and above LRETURN. The use of CSINDEX measure as an independent variable alone or with LRETURN does not change the coefficients of other variables of interest. Overall, it appears that the simple measure used at HOTELCORP captures the information content of a complex measure of customer satisfaction.

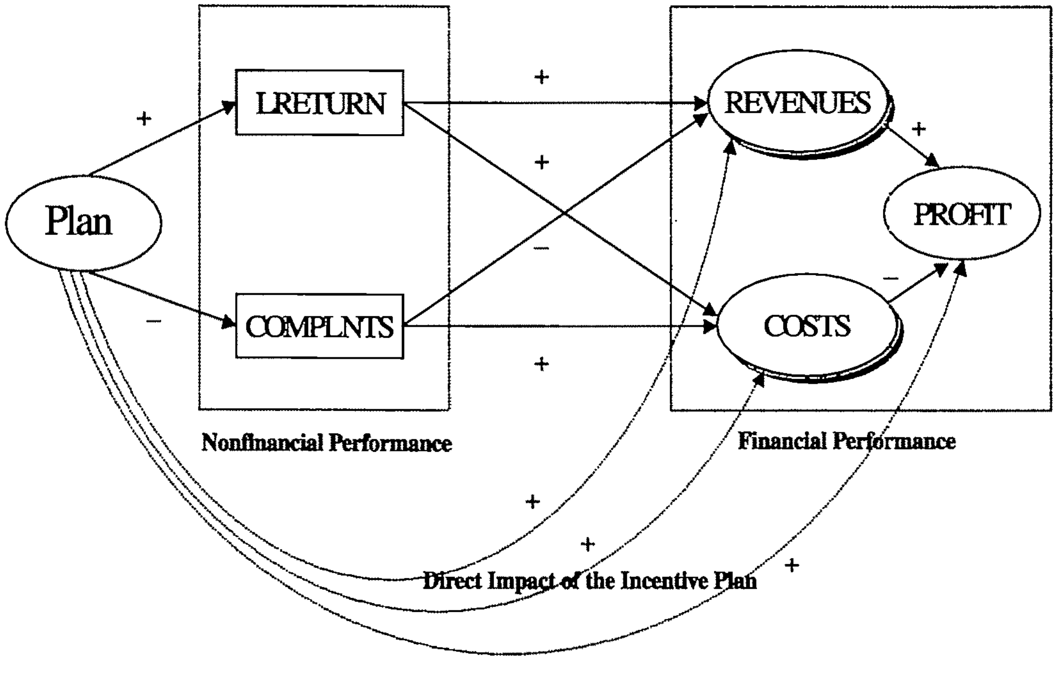
1995, 76). Analogous to defect rates in a manufacturing setting, customer complaints provide direct feedback on the hotel's operating processes and are useful for taking corrective actions. Thus, customer complaints can also be viewed as an internal business process measure (Kaplan and Norton 1996, 110–112; Ittner and Larcker 1998b, 208) that reflects the effectiveness of the operations at a hotel. Focusing on potential problem areas, responding quickly to and resolving customer concerns are examples of managerial actions that can reduce the number of complaints and sustain customer loyalty (Jones and Sasser 1995, 98). The customer complaints variable (COMPLNTS) is measured as the number of customer complaints per one thousand occupied rooms. HOTELCORP included this measure also because it provides an independent measure of customer satisfaction. Customers register their complaints either by calling the customer service center directly or by writing, and hence this measure cannot be manipulated easily. A high score on the likelihood of return measure with a high number of customer complaints suggests possible manipulation of the former measure. Cross-sectional correlation between these two measures ranged between −0.27 and −0.39 over the 72-month sample period.

III. ESTIMATION MODELS AND TESTS

Are Nonfinancial Measures Lead Indicators of Financial Performance?

Figure 1 summarizes the relation between the incentive plan, managerial effort, nonfinancial measures, and financial performance. Our first research question focuses on the predictive ability of nonfinancial measures. The predictive ability of nonfinancial measures is evaluated by estimating the relation between nonfinancial performance measures and

FIGURE 1
Relation Between Incentive Plan, Nonfinancial Measures, and Financial Performance



various measures of financial performance: operating profit and its two components, revenues and operating costs. Estimation of the individual relationships provides richer insights into how nonfinancial measures are associated with each component of profit. The following models are specified for estimation using pooled time-series data for 18 hotels:

$$\begin{aligned}\mathrm{REVENUE}_{it} = {} & \alpha_0^R + \sum_{i=1}^{17} \beta_i^R\,\mathrm{HOTEL}_i + \sum_{i=1}^{18} \gamma_i^R\,\mathrm{HOTEL}_i\,\mathrm{COMPREV}_{it} \\ & + \lambda^R\,\mathrm{REVENUE}_{i,t-1} + \eta_1^R\,\mathrm{AVGLRETURN}_{i,t6} \\ & + \eta_2^R\,\mathrm{AVGCOMPLNTS}_{i,t6} + \eta_3^R\,\mathrm{TOLLRES}_{it} + \varepsilon_{it}^R \end{aligned} \qquad \text{(M1)}$$

$$\begin{aligned}\mathrm{COST}_{it} = {} & \alpha_0^C + \sum_{i=1}^{17} \beta_i^C\,\mathrm{HOTEL}_i + \sum_{i=1}^{18} \gamma_i^C\,\mathrm{HOTEL}_i\mathrm{OCCRATE}_{it} + \lambda^C\,\mathrm{COST}_{i,t-1} \\ & + \eta^C\,\mathrm{ECI}_t + \eta_1^C\,\mathrm{AVGLRETURN}_{i,t6} + \eta_2^C\,\mathrm{AVGCOMPLNTS}_{i,t6} \\ & + \eta_3^C\,\mathrm{TOLLRES}_{it} + \varepsilon_{it}^C \end{aligned} \qquad \text{(M2)}$$

$$\begin{aligned}\mathrm{PROFIT}_{it} = {} & \alpha_0^P + \sum_{i=1}^{17} \beta_i^P\,\mathrm{HOTEL}_i + \sum_{i=1}^{18} \gamma_i^P\,\mathrm{HOTEL}_i\,\mathrm{COMPREV}_{it} + \lambda^P\,\mathrm{PROFIT}_{i,t-1} \\ & + \eta_1^P\,\mathrm{AVGLRETURN}_{i,t6} + \eta_2^P\,\mathrm{AVGCOMPLNTS}_{i,t6} \\ & + \eta_3^P\,\mathrm{TOLLRES}_{it} + \varepsilon_{it}^P \end{aligned} \qquad \text{(M3)}$$

where:

i = 1,...,18 represents the individual hotels,
t = 1,...,72 represents the months in our sample period
$\mathrm{REVENUE}_{it}$ = Total revenues per available room of hotel i in month t,
COST_{it} = Total operating cost per available room of hotel i in month t,
PROFIT_{it} = Operating profit per available room of hotel i in month t,
$\mathrm{COMPREV}_{it}$ = Average revenue per available room of competitors of hotel i in month t,
HOTEL_i = A dummy variable = 1 if hotel i, = 0 otherwise,
ECI_t = Employment Cost Index in month t,
$\mathrm{LRETURN}_{it}$ = Likelihood of return index for hotel i in month t,
$\mathrm{AVGLRETURN}_{i,t6}$ = Average likelihood of return for hotel i over the previous six months (i.e., $t-1$ to $t-6$),
$\mathrm{COMPLNTS}_{it}$ = Number of complaints per one thousand occupied rooms for hotel i in month t,
$\mathrm{AVGCOMPLNTS}_{i,t6}$ = Average number of complaints for hotel i over the previous six months (i.e., $t-1$ to $t-6$),
$\mathrm{TOLLRES}_{it}$ = Percentage of revenues through toll free lines for hotel i in month t,
ε_{it}^R, ε_{it}^C, and ε_{it}^P = random error terms.

The above models specify operating profit per available room and its components as functions of exogenous parameters, past financial performance, and lagged values[7] of nonfinancial measures. The exogenous variables that affect financial performance in the hotel industry include hotel-specific factors, seasonality, local, regional, and other economy-wide factors like inflation (Arthur Andersen & Co. 1993, 14; PKF Consulting 1994, 11). Therefore, to control for specific characteristics of individual hotels that may result in correlated residuals over time, we include intercept dummies for individual hotels in these fixed-effects models (Greene 1994). To control for other exogenous factors that affect revenues, we include an index (labeled COMPREV) measuring the average revenues per available room of competitors in the same location as the hotel. This measure (COMPREV) is the most widely used benchmark in the hotel industry and best captures the exogenous shocks that affect revenues such as seasonality and inflation experienced by the local hotel industry. COMPREV is computed by an independent agency that collects the relevant confidential information from participating hotels.

Unlike the revenue model, cost data for competitors that may control for seasonality and other factors are not available. Seasonal and trend variations in operating costs of individual hotels are primarily driven by volume. Therefore, we include occupancy rate (OCCRATE) to control for exogenous variations in operating costs. Including dummy variables for the 12 calendar months to control for any residual seasonal variations in operating costs does not alter the results. Operating costs may also increase over time because of inflation. While CPI is commonly used as a measure of inflation, in the specific context of the hotel industry, payroll costs can constitute more than half of the operating costs. Therefore, to control for changes in operating costs due to inflation, we include the Employment Cost Index (ECI) which measures the average total wages and benefits paid to employees. Because of lack of competitor data, for the PROFIT model we control for seasonal and other variations by including COMPREV as a control variable.[8] We include current TOLLRES as an independent variable because this financial measure is expected to be associated with contemporaneous financial performance, but the results are similar without this variable. We also include the previous period's financial performance to control for hotel-specific time trends and to examine whether nonfinancial measures provide additional information on future financial performance that is not reflected in current financial measures.

While earlier studies recognize that nonfinancial measures may have long-term impacts, there is no formal theory to identify the specific number of lags for nonfinancial measures. Anderson et al. (1994) use a half-year lag model, but do not present a theoretical justification. Therefore, it is necessary to undertake a specification search to determine the appropriate lag length. Specifically, Akaike's Information Criterion (AIC) is used to determine the lag length (Greene 1994, 515–517). AIC is similar in spirit to adjusted R^2 in that it rewards good fit but penalizes the loss of degrees of freedom. A search over a maximum length of 12 lags indicated that the model with a lag length of six resulted in the minimum AIC and hence was chosen as the most appropriate model. However, severe multicollinearity between the six lags (Condition Index > 300) makes the results difficult to interpret.

A common solution for multicollinearity problems is principal component analysis (Greene 1994). The first principal component of the lagged nonfinancial measures accounts for more than 55 percent of the variation and is given by an almost equally weighted average of the past six lags. Therefore, in order to mitigate the collinearity problem, we use AVGLRETURN and AVGCOMPLNTS, the moving average of the past six lags of the nonfinancial measures, as independent variables instead of six different lags.[9] Using the average of the lags implies a restriction that all lag coefficients are equal. We test the predictive ability of each nonfinancial measure by examining the coefficient of its average past realizations. The coefficient η of a nonfinancial measure is interpreted as its average long-run impact (Greene 1994, 512–513).

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[7] It is possible that nonfinancial measures may impact both current and future financial performance. However, current values of LRETURN and COMPLNTS, when included in the regressions, do not have any significant association with financial performance.

[8] Since COMPREV is highly correlated with OCCRATE, the inclusion of COMPREV is likely to capture volume-driven changes in both revenues and costs. The inclusion of OCCRATE as an additional control variable results in severe multicollinearity, but the principal results do not change appreciably.

Performance Impact of Incentive Plan

Impact of Incentive Plan on Nonfinancial Performance

Our second research question focuses on the performance impacts of including nonfinancial measures in incentive plans. Intuitively, one expects improvements in a performance measure when it is positively linked to monetary incentives. Agency theoretic research also supports the view that including a performance measure in an incentive plan that reports more precisely on one dimension of effort results in a reallocation of effort by managers leading to an improvement along the measured dimension (Feltham and Xie 1994; Banker and Thevaranjan 1997, 1999). As discussed earlier, at our research site, nonfinancial measures were reported, but not used, for incentive purposes prior to the implementation of the new plan. When nonfinancial measures are included in the incentive plan, managers reallocate their effort along the dimensions emphasized by those measures resulting in improvements in those measures.[10]

Ascertaining whether the new incentive plan resulted in a change in nonfinancial performance requires a model of the behavior of nonfinancial measures. It is difficult to specify a model of customer satisfaction measures (LRETURN and COMPLNTS). Data on likelihood of return are available for HOTELCORP's franchised hotels that did not implement the new incentive plan and thus serve as a control for exogenous factors affecting this performance measure. HOTELCORP's franchised hotels form a natural control group because they follow the same operational rules and guidelines, but they did not implement the incentive plan or make any major organizational changes that affect performance. Therefore, we specify:

$$\text{LRETURN}_{it} = \alpha_0^L + \sum_{i=1}^{17} \beta_i^L\, \text{HOTEL}_i + \gamma^L\, \text{LRETURNF}_t + \delta^L\, \text{PLAN}_t + \varepsilon_t^L \qquad \text{(M4)}$$

where:

LRETURNF_t = Average likelihood of return index for franchised hotels in month t,
PLAN_t = A dummy variable representing time periods following new incentive plan implementation, taking the value 1 for July 1993 and later, and 0 before July 1993.

No such comparative data are available for COMPLNTS that can serve as a control for exogenous factors affecting this nonfinancial measure. Therefore, we employ a commonly used impact assessment method in time-series analysis known as intervention or the transfer-function model. We specify each nonfinancial measure for a hotel as a function of a hotel-specific constant and its value in the previous period (McCleary and Hay 1980, 141–171; Pearce et al. 1985; Anderson et al. 1994). Transfer-function models first identify each dependent variable as a time series with systematic moving average or autoregressive components, and then estimate the effect of an event by introducing the event time as an intervention dummy variable. A significant change in the slope or level predictable from the model describing the time-series indicates that the intervention event had an effect on the dependent variables. Nonfinancial variables are modeled separately for each hotel as an ARMA process to identify the time-series parameter values that produce white noise. For most models with COMPLNTS as the dependent variable an AR(1) process with a constant parameter, resulted in residuals that are white noise, justifying the use of lagged values as independent variables.[11] Therefore, we specify:

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[9] In the hotel industry, a lag of six months seems to capture the repeat visits of customers and the economic consequences of their purchase behavior. This is especially true for business travelers who are the main guests of HOTELCORP.

[10] We do not claim that the old incentive plan was suboptimal or that the new incentive plan is optimal under the realized conditions. Our objective instead is to examine whether the performance of hotel managers changed on the implementation of the new incentive plan as if they were optimizing their effort choices given the contract.

$$\mathrm{COMPLNTS}_{it} = \alpha_0^M + \sum_{i=1}^{17} \beta_i^M\, \mathrm{HOTEL}_i + \sum_{i=1}^{18} \gamma_i^M\, \mathrm{HOTEL}_i\, \mathrm{COMPLNTS}_{i,t-1} + \delta^M\, \mathrm{PLAN}_t + \varepsilon_t^M \qquad \text{(M5)}$$

The impact of the incentive plan on nonfinancial performance is tested by examining whether the δ coefficients of the PLAN variable for these two models (M4 and M5) are significant.

Impact of Incentive Plan on Financial Performance

As shown in Figure 1, the implementation of the incentive plan can affect financial performance either indirectly by improving nonfinancial performance which then impacts financial performance, or by directly improving cost efficiency. Predicting the impact of the implementation of the plan on the components of income requires an understanding of the preexisting incentive plan. Recall that the company's prior plan was based mainly on operating profit. The new incentive plan provided slightly lower levels of incentives for achieving operating profit goals. Given overall effort aversion, this leads to a reallocation of some cost control effort at the margin to customer service effort. In our context, a reduction in cost control effort implies an increase in costs following the implementation of the new incentive plan. In addition, we expect that customer-satisfaction-oriented effort will increase. An increase in operating costs may also result from increased customer satisfaction effort. For example, managers may have to train their employees in customer service. Finally, the new incentive plan provides higher bonus potential for some managers and therefore, bonus costs are likely to increase following the implementation of the plan. Therefore, operating costs (both inclusive and exclusive of bonus costs) are likely to increase following the implementation of the new incentive plan.

Improvement in customer-satisfaction-oriented nonfinancial measures such as likelihood of return and complaints is expected to result in increased revenues. High customer satisfaction implies high loyalty of current customers, low price elasticities, insulation of current customers from competitive efforts, and the potential to attract new customers because of enhanced reputation and, therefore, a high revenue potential (Fornell 1992, 6, 11; Hauser et al. 1994, 330; Zeithmal et al. 1990, 9). Implementation of an incentive plan based on customer-satisfaction-oriented nonfinancial measures increases customer service effort and, consequently, it is likely to increase customer satisfaction. If customer satisfaction measures are lead indicators of future revenues, then we expect revenues to increase. While it is possible that costs may increase as discussed earlier, we expect that any cost increase would be lower than the corresponding revenue increase so that profits are expected to increase as a consequence of an increased emphasis on customer satisfaction.

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[11] For the model with LRETURN as the dependent variable, an AR(1) process with a constant parameter resulted in residuals that are white noise. We estimated an intervention model similar to model (M5) for the LRETURN variable and the results were qualitatively similar to those obtained based on model (M4).

Because of TOLLRES variable's construction as a ratio measure, the impact of the incentive plan change on TOLLRES will depend on the magnitude of the numerator and denominator effects. For example, an increase in revenue contribution from toll-free reservations (numerator) without a significant increase in total room revenues (denominator) will increase TOLLRES. Alternatively, an increase in revenue contribution from toll-free reservations (numerator) accompanied by an increase in total room revenues (denominator) due to other factors such as increased customer satisfaction may result in a decrease, no change, or an increase in TOLLRES. Overall, we expect that managers will respond to the incentive weight placed on TOLLRES and will take steps to increase this measure.[12] To estimate the impact of the incentive plan on TOLLRES, we specify an intervention model similar to model (M5). For most models with TOLLRES as the dependent variable an AR(12) process with a constant parameter resulted in residuals that are white noise, justifying the use of 12-month lagged value as the control variable.

A direct test of the impact of the new incentive plan on financial performance is conducted by estimating the following intervention models:

$$\begin{aligned}\mathrm{COST}_{it} = {} & \alpha_0{}^{C'} + \sum_{i=1}^{17} \beta_i{}^{C'}\, \mathrm{HOTEL}_i + \sum_{i=1}^{18} \gamma_i{}^{C'}\, \mathrm{HOTEL}_i\, \mathrm{OCCRATE}_{it} + \eta^{C'}\, \mathrm{ECI}_t \\ & + \delta^{C'}\, \mathrm{PLAN}_t + \varepsilon_{it}{}^{C'} \qquad \text{(M6)}\end{aligned}$$

$$\begin{aligned}\mathrm{REVENUE}_{it} = {} & \alpha_0{}^{R'} + \sum_{i=1}^{17} \beta_i{}^{R'}\, \mathrm{HOTEL}_i + \sum_{i=1}^{18} \gamma_i{}^{R'}\, \mathrm{HOTEL}_i\, \mathrm{COMPREV}_{it} \\ & + \delta^{R'}\, \mathrm{PLAN}_t + \varepsilon_{it}{}^{R'} \qquad \text{(M7)}\end{aligned}$$

$$\begin{aligned}\mathrm{PROFIT}_{it} = {} & \alpha_0{}^{P'} + \sum_{i=1}^{17} \beta_i{}^{P'}\, \mathrm{HOTEL}_i + \sum_{i=1}^{18} \gamma_i{}^{P'}\, \mathrm{HOTEL}_i\, \mathrm{PROFIT}_{i,t-12} + \delta^{P'}\, \mathrm{PLAN}_t \\ & + \varepsilon_{it}{}^{P'} \qquad \text{(M8)}\end{aligned}$$

$$\begin{aligned}\mathrm{TOLLRES}_{it} = {} & \alpha_0{}^{T} + \sum_{i=1}^{17} \beta_i{}^{T}\, \mathrm{HOTEL}_i + \sum_{i=1}^{18} \gamma_i{}^{T}\, \mathrm{HOTEL}_i\, \mathrm{TOLLRES}_{i,t-12} \\ & + \delta^{T}\, \mathrm{PLAN}_t + \varepsilon_t{}^{T} \qquad \text{(M9)}\end{aligned}$$

Econometric Considerations

Because we use time-series data in our regression models, serial correlation may bias the standard errors of the estimated coefficients. We control for serial correlation by using the Prais and Winsten (1954) estimator to make first-order autocorrelation adjustments to the variables. This estimator is consistent and performs especially well for short time series with a trend by ensuring that the initial observation is not discarded (Greene 1994, 432). All regression estimates reported here are based on the transformed variables. We tested for heteroskedasticity using White's (1980) test. Whenever appropriate, we used White's adjusted asymptotic standard errors to test the significance of the estimated coefficients. There were no appreciable differences between the F-tests and tests using asymptotic Chi-square.

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[12] We constructed an alternative measure of TOLLRES as the revenues booked through the central reservation system. The intervention model (M9) based on this measure also shows a positive impact on TOLLRES.

A common problem in studies that use lagged independent variables is that the independent variables tend to be highly correlated. When multicollinearity was detected using the Belsley et al. (1980) collinearity diagnostics, the variables causing the problem were dropped and models were re-estimated to ensure robustness of the results. Individual observations were considered influential if the studentized residuals were greater than an absolute value of three (Belsley et al. 1980, 27–29; Ittner and Larcker 1998a, 14). The number of outliers identified and deleted in the regression models shown in Tables 1–6 ranged between 1 and 16. The re-estimated parameters after omitting the influential observations have higher significance and exhibit robustness of the results.

IV. RESULTS

Descriptive Statistics

Panel A of Table 1 presents descriptive statistics for the 18 managed hotels (all numbers have been disguised by a scaling factor to maintain confidentiality). The overall dispersions shown in Table 1 reflect seasonal variations, differences in the size and type of hotels, and their geographic locations. Revenues per available room for individual hotels vary considerably over the 12 months. Revenues per available room in the peak months are on average 89 percent more than the revenues per available room in the lean months of a year for individual hotels. Competitors' revenues per available room (COMPREV) exhibit patterns similar to those of the revenue measure of the sample hotels, and suggest that COMPREV measure is an appropriate control for regional factors and seasonality that affect revenues. It also suggests that the sample hotels are typical of hotels in the industry and provides support for generalizing our firm-specific findings. Costs per available room for individual hotels also vary considerably over the 12 months but with a lower range of dispersion when compared to revenues. The highest cost per available room is on average between 20 percent and 40 percent more than the lowest cost per available room in a year for individual hotels. Nonfinancial measures (LRETURN and COMPLNTS) for the entire sample exhibit considerable variation, but the dispersion in these measures for individual hotels does not suggest any seasonal patterns as in the case of financial measures. The 6-month moving averages of these measures (AVGLRETURN and AVGCOMPLNTS) show even less dispersion. The TOLLRES measure exhibits a pattern similar to that of revenues per available room (REVENUE).

Panel B of Table 1 provides a comparison between the nonfinancial performance measures for the managed hotels and the franchised hotels. Overall, the managed hotels exhibit a higher level of customer satisfaction as measured by LRETURN and COMPLNTS than the franchised hotels. Panel B also suggests that while occupancy rate, TOLLRES, and nonfinancial performance as measured by LRETURN and COMPLNTS improved for both types of hotels after the implementation of the new incentive plan, the improvement was greater for the managed hotels than for the franchised hotels.

Table 2 presents the matrix of correlations between various variables of interest. Revenues per available room are positively and significantly correlated with LRETURN and

TABLE 1
Descriptive Statistics and Comparison between Franchised and Managed Hotels

Panel A: Descriptive Statistics for Managed Hotels

Variable	*n*	*Mean*	*Standard Deviation*	*First Quartile*	*Median*	*Third Quartile*
REVENUE	1079	86.96	25.56	68.41	86.26	103.89
COST	1079	66.50	16.55	56.24	65.88	76.03
AVGRATE	1079	126.20	27.01	111.19	126.71	143.30
OCCRATE	1079	0.69	0.15	0.60	0.71	0.80
LRETURN	1079	0.91	0.08	0.88	0.93	0.96
COMPLNTS	1079	0.92	0.65	0.45	0.80	1.22
TOLLRES	1079	37.58	17.14	25.88	34.57	45.94
AVGLRETURN	957	0.91	0.06	0.87	0.92	0.95
AVGCOMPLNTS	957	0.93	0.44	0.62	0.89	1.16
COMPREV	1079	52.01	16.74	39.40	49.56	63.20
CAVGRATE	1079	75.19	16.03	62.04	73.98	85.76
COCCRATE	1079	0.69	0.12	0.61	0.70	0.78

Panel B: Comparison between Franchised and Managed Hotels
(Standard deviation in parentheses)

	Franchised Hotels		*Managed Hotels*	
Variable	*Jan. 1993–July 1993*	*July 1993–Dec. 1996*	*Jan. 1991–June 1993*	*July 1993–Dec.1996*
LRETURN	0.83	0.85	0.89	0.93
	(0.16)	(0.15)	(0.07)	(0.08)
COMPLNTS	1.26	1.15	1.06	0.82
	(1.51)	(1.44)	(0.64)	(0.64)
TOLLRES	36.00	38.99	33.26	40.49
	(30.26)	(25.16)	(16.35)	(17.24)
OCCRATE	0.64	0.67	0.67	0.71
	(0.18)	(0.18)	(0.15)	(0.15)

REVENUE = Revenue per available room of a hotel,
COST = Operating cost per available room of a hotel,
AVGRATE = Average rate for a hotel measured as total revenues divided by number of occupied rooms in a month,
OCCRATE = Occupancy rate for a hotel measured as number of occupied rooms divided by number of available rooms in a month,
LRETURN = Likelihood of return index for a hotel in a month,
COMPLNTS = Number of complaints per one thousand occupied rooms for a hotel in a month,
TOLLRES = Room revenues booked through toll free lines as a percentage of total room revenues for a hotel in a month,
AVGLRETURN = Average likelihood of return for a hotel over the previous six months (i.e. t−1 to t−6),
AVGCOMPLNTS = Average number of complaints for a hotel over the previous six months,
COMPREV = Average revenue per available room of competitors of a hotel in a month,
CAVGRATE = Average rate of competitors of a hotel in a month, and
COCCRATE = Average occupancy rate of competitors of a hotel in a month.

All numbers are disguised by multiplying by a scalar.

TABLE 2
Correlation Matrix
(Spearman coefficients in the upper triangle; Pearson coefficients in the lower triangle)

	REVENUE	*COST*	*AVGRATE*	*OCCRATE*	*LRETURN*	*COMPLNTS*	*TOLLRES*	*AVG LRETURN*	*AVG COMPLNTS*	*COMPREV*	*CAVG RATE*	*COCC RATE*
REVENUE	**1.00**	0.84	0.63	0.70	0.23	−0.25	−0.28	0.30	−0.33	0.69	0.52	0.59
COST	0.86	**1.00**	0.70	0.44	0.36	−0.30	−0.23	0.42	−0.39	0.43	0.37	0.33
AVGRATE	0.63	0.73	**1.00**	−0.02^{NS}	0.25	−0.17	−0.19	0.30	−0.23	0.35	0.53	0.04^{NS}
OCCRATE	0.70	0.43	−0.09	**1.00**	0.02^{NS}	−0.12	−0.15	0.07	−0.21	0.59	0.21	0.78
LRETURN	0.24	0.31	0.18	0.11	**1.00**	−0.39	−0.01^{NS}	0.69	−0.43	−0.01^{NS}	0.00^{NS}	−0.05*
COMPLNTS	−0.25	−0.26	−0.14	−0.18	−0.27	**1.00**	0.12	−0.42	0.49	−0.07**	0.01^{NS}	−0.07**
TOLLRES	−0.33	−0.26	−0.26	−0.19	−0.04^{NS}	0.22	**1.00**	0.02^{NS}	0.15	−0.07**	0.03^{NS}	−0.14
AVGLRETURN	0.32	0.38	0.24	0.15	0.64	−0.31	−0.05*	**1.00**	−0.43	0.01^{NS}	0.01^{NS}	0.01^{NS}
AVGCOMPLNTS	−0.29	−0.34	−0.21	−0.18	−0.28	0.46	0.21	−0.43	**1.00**	−0.08	0.04*	−0.13
COMPREV	0.71	0.46	0.33	0.59	0.03^{NS}	−0.09	−0.11	0.03^{NS}	−0.05*	**1.00**	0.52	0.59
CAVGRATE	0.54	0.40	0.51	0.21	0.00^{NS}	−0.01^{NS}	−0.01^{NS}	−0.01^{NS}	0.04*	0.85	**1.00**	0.33
COCCRATE	0.58	0.32	−0.04^{NS}	0.78	0.01^{NS}	−0.12	−0.17	0.03^{NS}	−0.11	0.75	0.33	**1.00**

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*, ** Indicates that the correlation coefficient is significantly different from zero at the 10 percent, 5 percent level (two-tailed test), respectively.
^{NS} indicates that the correlation coefficient is not significantly different from zero at the 10 percent level (two-tailed test).
All other correlation coefficients are significantly different from zero at the 1 percent level (two-tailed test).
All correlations are based on pooled data and should be interpreted with caution.
See Table 1 for definitions of variables.

AVGLRETURN (ρ = 0.23 and 0.30, p = 0.0001) and negatively correlated with COMPLNTS and AVGCOMPLNTS (ρ = −0.25 and −0.33, p = 0.0001), consistent with the literature on customer satisfaction and the expectations of the senior management. COMPLNTS and LRETURN are negatively and significantly correlated (ρ = −0.39, p = 0.0001), but the magnitude is not so high as to suggest that these two measures are capturing the same aspect of customer satisfaction. TOLLRES is positively correlated with COMPLNTS and negatively correlated with LRETURN, revenues, and cost per available room. Although the negative correlation of TOLLRES with revenues appears contrary to the expectations of the senior management that an increase in this measure leads to increased revenues for the individual hotel, it is probably the result of the way TOLLRES is measured.[13] Occupancy rate (OCCRATE) is highly correlated with COMPREV (ρ = 0.59, p = 0.0001), suggesting that COMPREV is a good control for seasonal and regional variations. COMPREV is also highly correlated with revenues and costs. Although not shown in the table, CSINDEX is highly correlated with LRETURN (ρ = 0.63, p = 0.0001) suggesting that a simple measure of customer satisfaction reflects many aspects of customer service experience captured in a comprehensive measure.

Are Nonfinancial Measures Lead Indicators of Financial Performance?

Panel A of Table 3 presents OLS estimates of the relation between nonfinancial measures and financial performance as measured by the levels of revenues, operating cost and profit per available room. The overall regressions are significant (p = 0.0001) with adjusted R^2 ranging from 0.80 to 0.90. The coefficient (η_1) of AVGLRETURN is positively and significantly associated with revenues (p = 0.0001, one-tail) and profit per available room (p = 0.0005, one-tail). Although the coefficient (η_2) of AVGCOMPLNTS is negative, it is not significant (p = 0.1868 and 0.2989, one-tail, respectively) in the revenue and profit models. None of the nonfinancial measures are significantly ($p > 0.11$, one-tail) associated with operating cost per available room. This observation is consistent with the remarks of some hotel managers and corporate managers that after the change in the incentive plan, hotel managers initially changed their nonpecuniary personal effort but did not increase spending on activities that impact customer satisfaction. Although not included in the regression models reported above, the coefficients of current period customer satisfaction, LRETURN and COMPLNTS, are not significantly associated with current revenues and profit per available room. This result suggests that customer satisfaction impacts the future rather than the current financial performance. However, this must be interpreted with caution because of the high correlation between the lagged and current nonfinancial measures.[14]

Traditional accounting research relies on returns or changes models to assess the association between variables of interest and financial performance. The argument in favor of the returns or changes models is that these models reduce the bias in estimates resulting from spurious correlations and omitted variables. However, some studies dispute this claim and provide support in favor of the levels models (Kothari and Zimmerman 1995; Boschen

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[13] Recall that TOLLRES is measured in the incentive plan as a ratio of revenues booked through the central reservation system to the revenues realized in a month. Because revenues appear in the denominator, TOLLRES is negatively correlated (ρ = −0.33) with revenues. When TOLLRES is measured simply as the monthly revenues booked through the central reservation system, it is positively correlated with revenues (ρ = 0.22).

[14] One of the main reasons for the high levels of condition indices reported in Panel A of Tables 3 and 4 is the number of intercept terms in the fixed effects model. As can be seen from Panel B of these tables, when a single intercept is used, the condition indices are well below the cutoffs suggested by Belsley et al. (1980). AVGLRETURN for individual hotels is significantly correlated with the intercepts resulting in severe variance inflation. When the AVGLRETURN variable is dropped and the parameters reestimated, the resulting coefficient of AVGCOMPLNTS is qualitatively similar.

TABLE 3
Are Nonfinancial Measures Lead Indicators of Financial Performance?
(t-statistics in parentheses)

$$REVENUE_{it} = \alpha_0{}^R + \sum_{i=1}^{17} \beta_i{}^R HOTEL_i + \sum_{i=1}^{18} \gamma_i{}^R HOTEL_i COMPREV_{it} + \lambda^R REVENUE_{i,t-1} + \eta_1{}^R AVGLRETURN_{i,t6} + \eta_2{}^R AVGCOMPLNTS_{i,t6} + \eta_3{}^R TOLLRES_{it} + \varepsilon_{it}{}^R$$

$$COST_{it} = \alpha_0{}^C + \sum_{i=1}^{17} \beta_i{}^C HOTEL_i + \sum_{i=1}^{18} \gamma_i{}^C HOTEL_i OCCRATE_{it} + \lambda^C COST_{i,t-1} + \eta^C ECI_t + \eta_1{}^C AVGLRETURN_{i,t6} + \eta_2{}^C AVGCOMPLNTS_{i,t6} + \eta_3{}^C TOLLRES_{it} + \varepsilon_{it}{}^C$$

$$PROFIT_{it} = \alpha_0{}^P + \sum_{i=1}^{17} \beta_i{}^P HOTEL_i + \sum_{i=1}^{18} \gamma_i{}^P HOTEL_i COMPREV_{it} + \lambda^P PROFIT_{i,t-1} + \eta_1{}^P AVGLRETURN_{i,t6} + \eta_2{}^P AVGCOMPLNTS_{i,t6} + \eta_3{}^P TOLLRES_{it} + \varepsilon_{it}{}^P$$

Panel A: Levels Model (n = 957)

Variable	*REVENUE*	*COST*	*PROFIT*
Intercept	−5.79 (−0.573)	19.41*** (2.587)	−40.19*** (−5.536)
AVGLRETURN	35.71*** (4.37)	5.39 (1.005)	19.51*** (3.307)
AVGCOMPLNTS	−0.94 (−0.89)	−0.73 (−1.210)	−0.40 (−0.528)
PAST DEP. VARIABLE (LAG 1)	0.15*** (7.34)	0.33*** (11.767)	0.12*** (6.172)
ECI	—	9.17** (1.979)	—
Adj. R^2	0.9019	0.8995	0.8051
Condition Index	108.95	142.84	109.04

Panel B: Percent Change Model (n = 939)

Variable	*%Δ REVENUE*	*%Δ COST*	*%Δ PROFIT*
Intercept	2.57*** (6.113)	2.34*** (7.356)	79.02 (0.457)
%Δ AVGLRETURN	0.44** (1.665)	−0.003 (−0.017)	153.22* (1.382)
%Δ AVGCOMPLNTS	−0.04* (−1.419)	−0.03** (−1.865)	6.85 (0.629)
%Δ PAST DEP. VARIABLE (LAG 1)	−0.14*** (−6.506)	−0.33*** (−12.82)	0.02 (0.645)
%Δ ECI	—	−6.49*** (−9.036)	—
Adj. R^2	0.6099	0.4025	0.1980
Condition Index	1.51	2.02	1.51

(Continued on next page)

TABLE 3 (Continued)

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*, **, and *** Indicate that the estimated coefficient is significantly different from zero at the 10 percent, 5 percent, and 1 percent levels (one-tailed test), respectively.

PAST DEP. VARIABLE (LAG 1) = Lagged dependent variable of the respective models.

$HOTEL_i$ = A dummy variable = 1 if hotel i, = 0 otherwise.

See Table 1 for other variable definitions.

and Smith 1995). Specifically, in the context of compensation research, Boschen and Smith (1995, 579, 584) assert that the use of differenced empirical models can be supported only if performance has a permanent impact on pay (autocorrelation $\rho = 1$). In our context, where multiperiod effects of nonfinancial measures on financial performance are considered, the impact of nonfinancial measures is expected to have a decaying effect over time, and hence, the assumption of permanent impact is violated. Residuals from the levels model exhibit a low autocorrelation (ρ ranges between 0.1 and 0.4). Therefore, the levels model with a lagged dependent variable is more suitable for analyzing the lead-lag relationship between financial performance and nonfinancial measures. Nevertheless, we present the results of a percentage change model (Ittner and Larcker 1998a) in Panel B of Table 3. This model can be interpreted as testing whether changes in nonfinancial measures are associated with changes in financial measures. The results suggest that AVGLRETURN is positively associated with future revenues and profit per available room, although the significance is lower than its significance in the levels model. AVGCOMPLNTS exhibits stronger association with operating cost per available room, but is not significantly associated with revenues and profit per available room. Overall, the results indicate that one nonfinancial measure of customer satisfaction provides additional information about future financial performance that is not reflected in the past financial performance in this industry.

The marketing literature suggests that increased customer satisfaction can lead to an increase in revenues either because of increased price premiums that firms can charge and/or because of repeat business (Fornell 1992, 11; Zeithmal et al. 1990, 9). In the specific context of the hotel industry, an increase in revenues can result either because of increased rates (price effect), or an increase in occupancy (volume effect), or both. It is a common practice in the hotel industry to partition revenues into an average rate (AVGRATE, revenues divided by the number of occupied rooms) and occupancy rate (OCCRATE, occupied rooms divided by the number of available rooms). Therefore, we explore the relation between nonfinancial measures and these component measures of revenues. Panel A of Table 4 presents the levels regression estimates of the relation between the nonfinancial measures and occupancy rate and average rate. These models are similar to model (M1) except that AVGRATE and OCCRATE are the dependent variables with appropriate control variables based on competitor data. All the regressions are significant ($p = 0.0001$) with adjusted R^2 ranging from 0.82 to 0.89. The coefficient (η_1) of AVGLRETURN in the levels regressions is positively but not significantly ($p = 0.1578$, one-tail) associated with average rate. However, it is positively and significantly ($p = 0.0001$, one-tail) associated with occupancy rate. The results based on the percentage change model in Panel B are also consistent with these observations. This suggests that increased customer satisfaction as measured by LRETURN leads to increased revenues through its impact on occupancy. The coefficient (η_2) of AVGCOMPLNTS is negatively and significantly associated with average rate ($p = 0.0217$, one-tail) in the levels model suggesting that a decrease in customer complaints leads to an increase in average rate.

TABLE 4
Relation Between Nonfinancial Measures and Components of Revenues: Average Rate and Occupancy Rate
(t-statistics in parentheses)

$$AVGRATE_{it} = \alpha_0{}^A + \sum_{i=1}^{17} \beta_i{}^A HOTEL_i + \sum_{i=1}^{18} \gamma_i{}^A HOTEL_i CAVGRATE_{it} + \lambda^A AVGRATE_{i,t-1}$$
$$+ \eta_1{}^A AVGLRETURN_{i,t6} + \eta_2{}^A AVGCOMPLNTS_{i,t6} + \varepsilon_{it}{}^A$$
$$OCCRATE_{it} = \alpha_0{}^O + \sum_{i=1}^{17} \beta_i{}^O HOTEL_i + \sum_{i=1}^{18} \gamma_i{}^O HOTEL_i COCCRATE_{it} + \lambda^O OCCRATE_{i,t-1}$$
$$+ \eta_1{}^O AVGLRETURN_{i,t6} + \eta_2{}^O AVGCOMPLNTS_{i,t6} + \varepsilon_{it}{}^O$$

Panel A: Levels Model (n = 957)

Variable	*AVGRATE*	*OCCRATE*
Intercept	41.27** (1.847)	−0.39*** (−5.830)
AVGLRETURN	12.88 (1.004)	0.37*** (7.231)
AVGCOMPLNTS	−3.20** (−2.023)	−0.01 (−1.307)
PAST DEP. VARIABLE (LAG 1)	0.27*** (8.177)	0.14*** (7.545)
Adj. R^2	0.8244	0.8836
Condition Index	162.50	104.04

Panel B: Percent Change Model (n = 939)

Variable	*%Δ AVGRATE*	*%Δ OCCRATE*
Intercept	1.48*** (4.189)	0.76** (2.107)
%Δ AVGLRETURN	0.02 (0.100)	0.45** (1.923)
%Δ AVGCOMPLNTS	−0.02 (−0.978)	0.004 (0.152)
%Δ PAST DEP. VARIABLE (LAG 1)	−0.33*** (−10.907)	−0.09*** (−4.426)
Adj. R^2	0.2008	0.6510
Condition Index	1.66	1.50

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*, **, and *** Indicate that the estimated coefficient is significantly different from zero at the 10 percent, 5 percent, and 1 percent levels (one-tailed test), respectively.

PAST DEP. VARIABLE (LAG 1) = Lagged dependent variable of the respective models.

$HOTEL_i$ = A dummy variable = 1 if hotel i, = 0 otherwise.

See Table 1 for other variable definitions.

In summary, the analyses of the lead-lag relationship between the nonfinancial performance measures used at our research site and financial performance as measured by operating profit and its various components suggest that nonfinancial measures of customer satisfaction help predict future financial performance. Our results also suggest that the association between financial and nonfinancial performance may be a result of repeat purchase as opposed to increased price premiums charged to customers. This finding is similar to that of Ittner and Larcker (1998a) who report that customer satisfaction measures are associated with growth in new customers but not with increased profit from existing customers. We find no evidence that increased customer satisfaction is associated with increased operating costs, although it is possible that expenditures on capital investments may have increased to support a customer-satisfaction strategy.

Performance Impact of Incentive Plan Change

Impact of Incentive Plan Change on Nonfinancial Performance

We now discuss the performance impacts of the new plan. Estimates of the impact of the change in the incentive plan on nonfinancial measures are presented in Table 5. Consistent with the pre-post comparisons shown in Panel B of Table 1, the regression estimates based on models (M4) and (M5) show that the change in the incentive plan has a moderate impact on LRETURN and COMPLNTS. The intercept hotel dummies are significant and explain about 30 percent of the variation in the dependent variable. The LRETURN model is significant ($p = 0.0001$, adjusted $R^2 = 0.9292$) with the coefficient δ^L positive and

TABLE 5
Impact of Incentive Plan Change on Nonfinancial Performance
(t-statistics in parentheses)

$$LRETURN_{it} = \alpha_0{}^L + \sum_{i=1}^{17} \beta_i^L HOTEL_i + \gamma^L LRETURNF_t + \delta^L PLAN_t + \varepsilon_t{}^L$$

$$COMPLNTS_{it} = \alpha_0{}^M + \sum_{i=1}^{17} \beta_i^M HOTEL_i + \sum_{i=1}^{18} \gamma_i^M HOTEL_i COMPLNTS_{i,t-1} + \delta^M PLAN_t + \varepsilon_t{}^M$$

Variable	*Coefficient*	*Predicted Sign*	*LRETURN Model (n = 1079)*	*COMPLNTS Model (n = 1061)*
Intercept	α_0	?	0.16*** (5.852)	0.71*** (5.198)
PLAN	δ	+ for LRETURN − for COMPLNTS	0.01*** (3.128)	−0.09*** (−2.503)
Adj. R^2			0.9292	0.3321

*** Indicates that the estimated coefficient is significantly different from zero at the 1 percent level (one-tailed test).

$LRETURNF_t$ = Average likelihood of return index for franchised hotels in month t.

$HOTEL_i$ = A dummy variable = 1 if hotel i, = 0 otherwise.

$PLAN_t$ = A dummy variable representing time periods following new plan implementation, taking the value 1 for July 1993 and later, and 0 before July 1993.

See Table 1 for other variable definitions.

significant ($p = 0.0009$, one-tail). This suggests that the incentive plan resulted in an increase in customer satisfaction as measured by the likelihood of return (LRETURN) measure. The COMPLNTS model ($p = 0.0001$, adjusted $R^2 = 0.3321$) reveals that the δ^M coefficient is negative and significant ($p = 0.0063$, one-tail) indicating a favorable impact of the incentive plan on customer complaints. The models (M4 and M5) reestimated together using the Seemingly Unrelated Regression (SUR) method yielded similar results. Overall, these results support the assertion that "what you measure is what you get" (Singleton-Green 1993, 52).

Impact of Incentive Plan Change on Financial Performance

Table 6 presents the estimation results of the impact of the incentive plan on the three measures of financial performance. The results of model (M6) in which COST is the dependent variable reveal that the overall regression is significant with an adjusted R^2 of 0.8933. The coefficient of the PLAN variable is negative and significant ($p = 0.0027$, one-tail). Contrary to our expectations that were discussed earlier, this result indicates that hotel

TABLE 6
Impact of Incentive Plan Change on Financial Performance
(t-statistics in parentheses)

$$COST_{it} = \alpha_0^{C'} + \sum_{i=1}^{17} \beta_i^{C'} HOTEL_i + \sum_{i=1}^{18} \gamma_i^{C'} HOTEL_i OCCRATE_{it} + \eta^{C'} ECI_t + \delta^{C'} PLAN_t + \varepsilon_{it}^{C'}$$

$$REVENUE_{it} = \alpha_0^{R'} + \sum_{i=1}^{17} \beta_i^{R'} HOTEL_i + \sum_{i=1}^{18} \gamma_i^{R'} HOTEL_i COMPREV_{it} + \delta^{R'} PLAN_t + \varepsilon_{it}^{R'}$$

$$PROFIT_{it} = \alpha_0^{P'} + \sum_{i=1}^{17} \beta_i^{P'} HOTEL_i + \sum_{i=1}^{18} \gamma_i^{P'} HOTEL_i PROFIT_{i,t-12} + \delta^{P'} PLAN_t + \varepsilon_{it}^{P'}$$

$$TOLLRES_{it} = \alpha_0^{T} + \sum_{i=1}^{17} \beta_i^{T} HOTEL_i + \sum_{i=1}^{18} \gamma_i^{T} HOTEL_i TOLLRES_{i,t-12} + \delta^{T} PLAN_t + \varepsilon_t^{T}$$

Variable	*Coefficient*	*Predicted Sign*	*COST Model (n = 1079)*	*REVENUE Model (n = 1079)*	*PROFIT Model (n = 863)*	*TOLLRES Model (n = 863)*
Intercept	α_0	?	0.88 (0.351)	33.33*** (5.212)	8.32*** (3.63)	10.96*** (2.732)
PLAN	δ	+	−1.12*** (−2.794)	1.56*** (2.425)	1.00* (1.585)	5.31*** (5.832)
Adj. R^2			0.8933	0.8708	0.6697	0.5724

***, * Indicate that the estimated coefficient is significantly different from zero at the 1 percent and 10 percent levels (one-tailed test), respectively.

$PLAN_t$ = A dummy variable representing time periods following new plan implementation, taking the value 1 for July 1993 and later, and 0 before July 1993.

$HOTEL_i$ = A dummy variable = 1 if hotel i, = 0 otherwise.

ECI_t = Employment Cost Index in month t.

See Table 1 for other variable definitions.

managers did not reduce cost reduction efforts or increase spending to improve customer satisfaction.[15]

Table 6 also presents an estimate of the impact of the incentive plan change on revenues per available room. The overall regression is significant with an adjusted R^2 of 0.8708. The coefficient δ^R for PLAN is positive and significant ($p = 0.0078$) supporting the hypothesis that an increased emphasis on customer satisfaction leads to increased revenues. This result is consistent with the earlier results that customer-satisfaction measures are positively associated with revenues and customer-satisfaction measures improved following the change in the incentive plan. Overall, the results indicate that the incentive plan change has a positive and significant effect on revenues after controlling for inflation and competitors' performance.

The impact of incentive plan change on profit per available room is shown in the third column of Table 6. The overall regression is significant ($p = 0.0001$), and δ^P is positive and significant ($p = 0.0567$, one-tail) suggesting that the incentive plan change resulted in increased operating profit per available room. Following the incentive plan change, revenues increased whereas costs decreased significantly, resulting in a net favorable impact on profit. The impact of incentive plan change on TOLLRES is shown in the last column of Table 6. The regression estimates based on model (M9) show that the change in the incentive plan has a considerable impact on TOLLRES. The model is significant ($p = 0.0001$) with a positive and significant δ^T ($p = 0.0001$). This indicates that the change in the incentive plan resulted in a greater emphasis on reservations booked through the reservation center.

Overall, these results suggest that both nonfinancial and financial performance improved following the implementation of an incentive plan that includes nonfinancial performance measures.[16,17] While it is tempting to attribute this improvement solely to the inclusion of nonfinancial measures in the incentive compensation plan, caution needs to be exercised because of the nature of the incentive plan implementation. Recall that although the new incentive plan did not change its emphasis on operating profit, it differed from the earlier plan by including nonfinancial measures, changing from individual performance measures (mainly financial) to common performance measures (nonfinancial), and increasing the maximum bonus payments for some managers. Therefore, the improvement in financial performance can not be entirely ascribed to the inclusion of nonfinancial measures.[18]

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[15] Our cost data include the cost of bonuses paid to managers on an accrual basis. We do not have access to HOTELCORP's confidential compensation data. Our results indicate that operating costs (including bonus costs) decreased significantly after the implementation of the incentive plan, suggesting that operating costs (exclusive of bonus costs) also decreased following the implementation. Model (M6) was estimated with the Consumer Price Index (CPI), and different indices for employment cost such as ECI for blue-collar employees, ECI for retail industry and ECI for service industries. The results are robust to these alternative measures of inflation. However, when costs are not controlled for inflation, the results indicate an increase in operating costs per available room following the implementation of the incentive plan.

[16] We also conducted random subsample analysis using bootstrapping methods (Efron and Tibshirani 1993). Specifically, based on the bootstrap macro routine supplied by the SAS Institute, we generated 200 random subsamples for each regression model shown in the tables and computed the bootstrapped standard errors for each parameter. On average, OLS standard errors are comparable to the bootstrapped standard errors, and our results are robust to these random subsample selections.

[17] Results of our analyses are robust to the presumed month of implementation. Managers of individual hotels were aware of the proposed incentive plan three months before the actual implementation. If the managers had already started making changes in their customer-service efforts starting in April 1993, then the estimates of the impact of incentive plan on all measures of performance described above would be downward-biased. To test the sensitivity of those results to the possibility of different "event dates," the models were re-estimated using April 1993 as the start of the incentive plan. The results (not shown here) are very similar to the results using July 1993 as the start of the incentive plan.

V. CONCLUDING REMARKS

In this study, we analyzed field-based data from 18 managed properties of a hotel chain that revised its old managerial incentive compensation plan based mainly on financial measures to a new plan that includes nonfinancial performance measures. We documented that customer-satisfaction measures at our research site are significantly associated with future financial performance as measured by individual business unit revenues and operating profit, but not with operating costs. Moreover, our analysis provided some qualified support for the argument that customer satisfaction is associated more with long-term rather than immediate financial performance. At our research site, a simple measure of customer satisfaction was just as effective as a complex measure in predicting financial performance. The positive association between future revenues and current nonfinancial performance is mainly driven by occupancy (volume effect) as opposed to room rates (price effect). Our analysis also documented that nonfinancial performance improves following the implementation of the incentive plan that included nonfinancial measures. Financial performance as measured by operating profit also improves both in terms of long-term increases in revenues associated with current improvement in customer satisfaction and reduction in operating costs.

There are several limitations to this study. Because the research site is representative of other hotel chains in the industry, the findings of this study based on firm-specific data may be generalized to the hospitality industry, albeit with some caution. However, generalization to other industries is not possible. For example, our analysis indicates that there is an average lag of six months between customer satisfaction and future financial performance in the hotel industry. The short lag in this service industry is similar to retail banking (Ittner and Larcker 1998a) and seems to capture the economic consequences of the frequent visits of customers. However, it is possible that there are longer lags in manufacturing industries with less frequent customer purchases of products. Another limitation pertains to data availability. The absence of a carefully designed control group necessitates caution in the interpretation of the results of this quasi-experiment. The study relies on alternative control measures in the form of comparative data for competitors or franchised hotels, but such comparable measures were not available for some models. Finally, our findings are also limited by our model specification in the absence of a theoretical functional relation between customer satisfaction and financial performance, and the inherent arbitrariness and errors in the measurement of customer satisfaction.

Our study raises some interesting questions. Hotel managers received a substantial annual bonus based on profit before the change in the incentive plan, and there was only a six-month lag between customer satisfaction and profit. Why then did they not exert the appropriate effort to improve customer satisfaction, and why did the incorporation of the customer-satisfaction measures in compensation lead to improvements in both customer satisfaction and profit? Interviews with senior managers at HOTELCORP and the general manager of a hotel revealed that although hotel managers were aware of the strategic importance of customer satisfaction for financial performance, they did not know either the timing or the magnitude of this relation. Without such knowledge, managers did not recognize the true benefit of allocating more effort and resources to improve customer satisfaction, and did not do so until the change in the compensation plan that focused their attention on improving the customer-satisfaction measures. This explanation is consistent with Kaplan and Norton's (1996, 17) assertion that an essential benefit from the implementation of a balanced scorecard is the understanding of the timing and magnitude of the link between the levers managers control and future financial performance. When managers become better informed about how and when the levers they control impact financial performance, formal incentives based on nonfinancial measures related to these levers may not be essential to augment financial measures, provided the lag between managerial action and financial performance is not longer than the manager's decision horizon. We believe it will be fruitful to direct future research to enhancing our understanding of this complex interplay between knowledge of links between nonfinancial and financial measures, structure of incentive plans, and performance along those different dimensions.

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[18] In our research setting, analysis based on available data shows that total revenues, rooms supplied, and occupancy rate for the franchised hotels of HOTELCORP also show an increase relative to upscale/midscale hotel chains in the U.S. after the implementation of the incentive plan for the managed hotels. This finding suggests one more rationale for the use of customer satisfaction measures in performance evaluation in the hotel industry where such externalities are important. However, the results must be viewed with caution because several other factors such as changes in franchise fee structures, market niche, promotional efforts, contractual obligations, and other macroeconomic factors may influence growth in franchised hotels and revenues.

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Budgeting: An Experimental Investigation of the Effects of Negotiation

Joseph G. Fisher
Indiana University
James R. Frederickson
Hong Kong University of Science and Technology
Sean A. Peffer
University of Kentucky

ABSTRACT: Despite the common use of negotiations to set budgets in practice, accounting research has focused primarily on budgets set unilaterally by subordinates, while goal-setting research in management has focused primarily on budgets set unilaterally by superiors. In addition, budgeting research in accounting has focused almost exclusively on the planning aspects of budgets to the exclusion of their motivational aspects. This study complements prior research in two ways. First, the study examines how budgets and the economic consequences of the budget-setting process differ when budgets are set through a negotiation process vs. when set unilaterally. The study also considers factors associated with negotiation agreement and the relation between agreement and the economic consequences of negotiated budgets. Second, the economic consequences examined are budgetary slack and subordinate performance, allowing us to address the trade-offs between the planning and motivational aspects of budgets.

Negotiated budgets differ from unilaterally set budgets in a manner consistent with social norms and/or information transfer occurring during negotiations. Both the budgets and the economic consequences of the budget-setting process differ when budgets are set through a negotiation process where superiors have final authority in the event of a negotiation impasse vs. when set unilaterally by superiors. Further, negotiation agreement significantly affects the economic consequences of negotiated budgets. Budgets set

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through a negotiation process ending in agreement contain significantly less slack. A failed negotiation followed by superiors imposing a budget has a significant detrimental effect on subordinate performance.

Key Words: *Budgeting, Budgetary slack, Negotiation, Participative budgeting.*

Data Availability: *Data are available from the authors upon written request.*

I. INTRODUCTION

Almost all large and medium-size companies have formal budgeting programs (Umapathy 1987, 18), with the budget usually set through a negotiation process between superiors and subordinates (Howell and Sakurai 1992, 32; Anthony and Govindarajan 1994, 383).[1] Despite the use of negotiation to set budgets in practice, accounting research has focused primarily on situations where subordinates unilaterally set budgets (e.g., Chow et al. 1988, 1991, 1995; Waller 1988; Young 1985), and goal-setting research in management (Locke 1968; Locke and Latham 1990) has focused primarily on situations where superiors unilaterally set the goal. Thus, budget negotiation has drawn little attention in either accounting or management research.

Negotiation research in social psychology and economics (see Lewicki et al. [1994] or Hey [1991] for reviews) often uses a bilateral monopoly setting where subjects negotiate a selling price for a good (Rubin and Brown 1975). Such negotiations differ from budget negotiations in important ways, limiting the generalizability of that research to budget negotiations. First, in the bilateral monopoly setting, a negotiation impasse is resolved either by using third-party arbitration or by simply withdrawing from the negotiation, neither of which are typical options in budget negotiations (Umapathy 1987). Second, the outcome in bilateral monopoly negotiations (i.e., selling price) directly determines the negotiators' respective payoffs, whereas the outcome in budget negotiations (i.e., budget) is only an intermediate step in determining the negotiators' respective payoffs. Subordinates must exert effort before final outcomes and payoffs can be determined, and their effort level may be a function of the negotiation process and/or negotiated budget. These differences limit what we learn about extant budget negotiations from studies of behavior in bilateral monopolies.

In addition, budgeting research in accounting has focused almost exclusively on the planning aspect of budgets (i.e., budgetary slack) to the exclusion of their motivational aspects, whereas goal-setting research has focused almost exclusively on the motivational aspects of budgets (i.e., subordinate performance) to the exclusion of their planning aspects. However, Umapathy's (1987, 27) finding that nearly 75 percent of the companies in his sample use the same budget for both planning and motivational purposes suggests it is important to examine simultaneously the planning and motivational aspects of budgets, particularly since there may be trade-offs between those aspects (Barrett and Fraser 1977, 141).

The broad issue addressed in this paper is whether budget negotiation affects budgetary outcomes. We examine whether negotiating budgets vs. unilaterally setting budgets affects the budget level and resulting economic consequences (i.e., budgetary slack and subordinate performance). This analysis allows us to compare the economic consequences of negotiated budgets to those of budgets unilaterally set in prior accounting and organizational behavior research. Our comparisons provide evidence about the generalizability of results from prior research that focused on unilaterally set budgets to the more common setting where budgets are set through negotiation. In addition, we examine how negotiation impacts both budgetary slack and subordinate performance, which provides evidence about the trade-offs between the planning and motivational aspects of budgets.

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[1] We define a negotiation process as any iterative budget-setting process where both superiors and subordinates participate. Such processes could vary from a series of budget reviews and revisions to formal negotiation procedures.

One factor likely to affect negotiation outcomes is negotiation power (Salancik and Pfeffer 1977). Negotiators have power when they have the ability to bring about outcomes they desire (Lewicki et al. 1994). Being able to unilaterally set the budget implies complete power over the budget level. To isolate the effects of negotiation, it is necessary to hold constant the power to affect the final budget. We therefore examine (1) budgets set unilaterally by subordinates vs. budgets set through a negotiation process where subordinates have the power to set budgets in the event of a negotiation impasse, and (2) budgets set unilaterally by superiors vs. budgets set through a negotiation process where superiors have final authority. The party (superiors or subordinates) who begins the negotiation is a second factor likely to affect budget outcomes (Neale and Bazerman 1991). We therefore consider the effect of which party makes the initial budget proposal on the level of negotiated budgets.

We also examine negotiation agreement because it is a fundamental aspect of any negotiation (Tripp and Sondak 1992), and because it is expected to be associated with the degree of budget slack and the level of subordinate performance. Given the expected importance of budget agreement, we examine (1) factors associated with whether budget negotiations end in agreement, and (2) how agreement impacts budgetary slack and subordinate performance. Moreover, when comparing the economic consequences of unilaterally set vs. negotiated budgets, we partition negotiated budgets based on whether the negotiation dyads reach agreement. Examining the effects of negotiation agreement provides knowledge about the costs associated with failing to reach agreement and provides a foundation for a better understanding of budget negotiations.

We conducted a laboratory experiment in which subjects were assigned the role of either superior or subordinate in a budget-setting task. The results indicate that budgets set through a negotiation process differ from budgets set unilaterally and that superiors and subordinates in the negotiation condition adopt different negotiation strategies. Superiors in the negotiation condition take initial positions not significantly different from their desired budgets (i.e., unilaterally set budgets) and then make concessions in the subsequent negotiation process that lead them away from their desired budgets. Such concessions are consistent with a social norm of making concessions in negotiations (Pruitt and Carnevale 1993) and/or with responding to information provided by subordinates during negotiations. On the other hand, subordinates take initial negotiation positions significantly below their desired budgets. Such initial positions allow them to make concessions in negotiations while arriving at final budgets not significantly different from their desired budgets. The results also provide insight into the precursors and consequences of negotiation agreement. The differences in negotiators' initial positions are significantly smaller for dyads that reach agreement than for dyads that do not. The effect of negotiation agreement on budgetary slack is not independent of whether superiors or subordinates have final budgetary decision authority. Budgetary slack is greater when subordinates agree to budgets and superiors have final budget authority than when superiors agree to budgets and subordinates have final budget authority. Importantly, a failed negotiation followed by superiors imposing a budget has a significant detrimental influence on subordinate performance. Overall, the results indicate that negotiation generates different budgets and economic consequences than a unilateral budget-setting process.

The remainder of the paper is organized as follows. The hypotheses are developed in the next section. In Section III, the experimental method is described. The results are reported in Section IV. The concluding section discusses the implications of the findings, the study's limitations, and directions for future research.

II. HYPOTHESIS DEVELOPMENT

Setting and Incentives

The focus of our experiment is on dyads that consist of a superior and a subordinate. We provide subordinates with private information about their own performance capability (from pre-experimental trials). The dyads set production budgets by either (1) a unilateral decision of one party or (2) a process of negotiation between the two parties. Our unilateral budget-setting conditions include budgets established by subordinates and budgets established by superiors because both conditions have been examined in previous research (e.g., Chow et al. 1988; Waller 1988; Locke 1968). In the negotiation conditions, one party proposes a budget and the other party either agrees to the budget or makes a counter offer.

The outcomes of the budget processes include a budget, the subordinates' personal performance goals, the level of subordinates' commitment to the budget, and budgetary slack. Budgets are the formal, institutional performance goals that result from the budget-setting process. Subordinates' personal goals are generally unobservable and represent the performance levels subordinates actually intend to attain (Tubbs and Ekeberg 1991) and may be less than, equal to, or greater than the budget. "Subordinate commitment" refers to subordinates' determination to attain the budget and is a function of the degree of discrepancy between the budget and their personal goals (Locke and Latham 1990). Budgetary slack is the difference between subordinates' best estimate of performance and the budget (Chow et al. 1988, 1991, 1995; Waller 1988; Young 1985; Young et al. 1993). Once the budget is set, subordinates exert effort, which in turn affects their performance and firm revenues.

A precursor to negotiation is conflict (Lewicki et al. 1994). We create conflict in our experiment with the following compensation contracts:

$$P_{subordinate} \begin{array}{ll} = F & \text{if } X \leq B \\ = F + A(X - B) & \text{If } X > B \end{array} \tag{1}$$

$$P_{superior} \begin{array}{ll} = R(DX - F) & \text{if } X \leq B \\ = R\{DX - [F + A(X - B)]\} & \text{if } X > B \end{array} \tag{2}$$

where:

P = compensation;
F = subordinate fixed compensation;
A = subordinate compensation per unit of production over budget;
X = actual production;
B = budget;
D = profit, exclusive of subordinate compensation, per unit produced; and
R = superior's percentage of firm profit.

The subordinates' contract in equation (1) is a budget-based, slack-inducing contract, which means that it provides incentives for subordinates to understate their production capability. The superiors' contract in equation (2) is based on firm profit.[2] The contracts described in equations (1) and (2) provide subordinates and superiors with conflicting incentives in the budget-setting process. To understand the nature of this conflict, one must first understand how equation (1) affects the relation between the budget and subordinate performance. First, consider budgets set below subordinates' performance capabilities. A low budget ensures subordinates an incremental monetary gain from incremental effort and should motivate subordinates to set their personal goals approximately equal to their performance capabilities. Thus, equation (1) provides an incentive for subordinates to produce to their capabilities when the budget is less than their capabilities. Now consider budgets set above subordinates' performance capabilities. The subordinate contract in equation (1) provides no economic incentive to exert effort in such situations.[3] Thus when the budget is higher than their performance capabilities, equation (1) provides an incentive for subordinates to set their personal goals below the budget and have a low degree of commitment to the budget. The result will be low subordinate performance.

The nature of the superior-subordinate conflict induced by the contracts specified in equations (1) and (2) can now be made clear. Note that subordinate compensation from equation (1) is maximized when the budget (B) equals zero. However, due to nonmonetary factors such as social pressure (Chow et al. 1988; Young 1985) and disutility for lying, subordinates are likely to prefer budgets that are less than their performance capabilities but greater than zero (see, e.g., Chow et al. 1988; Waller 1988). Superiors' preferences for a particular budget level is less clear. The relation between superior compensation as specified in equation (2) and the budget (B) is more complex because the budget affects both (a) subordinates' motivation to exert effort (and thus firm revenues), and (b) the allocation of firm revenue between superiors and subordinates. For a given performance level, superiors' compensation is positively (negatively) associated with budget level (slack) for budget levels up to the given performance level. As explained above, budgets impact subordinate performance. In particular, budgets set above subordinates' performance capabilities are expected to have a detrimental impact on subordinate performance. The implication is that superiors must trade off the motivational aspects of B with its revenue-sharing aspects. That is, superiors want budgets that motivate substantial subordinate effort, while containing minimal slack.

Hypotheses

The basic issue addressed in this paper is whether budget negotiations affect budget levels and outcomes. In this section, we develop hypotheses about how specific aspects of the budget-setting process affect budget levels, budget slack, and subordinate performance.

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[2] Experimental accounting research has examined both truth-inducing and slack-inducing contracts for subordinates. We use a slack-inducing contract because slack-inducing contracts are common in practice (Henderson 1989; Umapathy 1987) and truth-inducing contracts are rare (Waller 1994). The superior's compensation is dependent on firm profit which is consistent with a common assumption in agency theory that principals (i.e., superiors) have a residual interest in the product of the agency which is influenced by agents' (i.e., subordinates') efforts (Baiman 1982; Magee 1980). In addition, many companies compensate executives based on profit (Crystal 1993; Dillard and Fisher 1990; Healy 1984; Merchant 1989).

[3] We assume that subordinates are effort averse. A pure economic perspective would suggest that subordinate performance will drop to zero for budgets that are greater than or equal to subordinates' performance capabilities. However, goal-setting research (Locke 1968), which considers both economic and behavioral factors, provides an alternative perspective. This research documents a negative linear relation between goal (i.e., budget) level and subordinate performance when subordinates are not committed to the goal (Erez and Zidon 1984; Locke and Latham 1990). Goal commitment is generally negatively associated with goal difficulty (Erez and Zidon 1984; Hollenbeck and Klein 1987; Locke and Latham 1990), which suggests a negative relation between budget levels above subordinates' capabilities and subordinate performance.

Effects of Negotiation

Negotiation behavior. If budgets are set through a negotiation process where superiors (subordinates) have final budget-setting authority in the event of a negotiation impasse, the superiors (subordinates) can offer a budget of x and not deviate from that offer. This strategy either (1) forces subordinates (superiors) to agree to a budget of x or (2) creates a negotiation impasse, with the superiors (subordinates) then setting the budget at x. Negotiators who have the power to set the budget in the event of a negotiation impasse are expected to adjust their positions during negotiation due to social norms and/or information transfer. Social norms suggest that negotiators should make concessions in a negotiation, particularly if the other party has done so (Pruitt and Carnevale 1993). Further, Luft and Libby (1997) show that fairness issues, which are the bases for many social norms (Pruitt and Carnevale 1993, 119), cause negotiators to concede, even when doing so is not in the negotiators' best economic interest. Negotiation also creates the opportunity for one party to obtain information from the other. In our setting, negotiation allows superiors to obtain information from subordinates, who have private information about their individual performance capabilities. Although superiors know subordinates have economic incentives to understate performance capabilities, superiors have incentives to rely, at least partially, on the biased information. For example, negotiation involves subordinates in the budget-setting process and creates the expectation that the final budget will reflect the subordinates' input (Lindquist 1995). If the superiors fail to adequately incorporate the subordinates' input into their counteroffers, subordinates are likely to perceive the negotiation process and resulting budget as unfair (Lindquist 1995) and this perception is likely to have a detrimental impact on subordinate performance.

This discussion suggests that negotiators who have final authority will make concessions during budget negotiations, causing the final budget to be less extreme than the negotiators' initial negotiation positions.[4]

H1: For negotiators who have final authority, budgets will be less extreme than their initial negotiation positions.

Effect of negotiation on budget level. Support for H1 does not necessarily imply that negotiated budgets are different from unilaterally-set budgets. For example, superiors (subordinates) could select initial negotiation positions above (below) their desired budget levels to create room to make concessions. Such strategic behavior by superiors (subordinates) would support H1, but the resulting negotiated budgets could be the same as the budgets set unilaterally. Thus, we examine whether negotiation affects the final budget level. To isolate the effects of negotiation, we hold constant the power to affect the final budget by examining budgets set unilaterally by superiors (subordinates) vs. budgets set through a negotiation process where superiors (subordinates) have the power to set the budget in the event of a negotiation impasse.[5]

We do not expect negotiation to impact the behavior of superiors and subordinates in the same manner. First, consider budgets set unilaterally by superiors and negotiated budgets where superiors have final authority. Assume superiors set budgets of y in the unilateral condition, where y is based on the superiors' desire to set the budget at a level high enough to avoid excessive incentive compensation to the subordinates but not so high as to demotivate them. Superiors have inferior information about subordinates' performance capabilities and some unilaterally-set budgets are likely to be set above subordinates' performance capabilities.

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[4] Social norms and information transfer are also expected to cause negotiators who do not have final authority to make concessions during budget negotiations. However, lack of final authority in the budget negotiation is expected to give these negotiators an additional reason to make concessions. Because of this potential confound, we have excluded from H1 negotiators who do not have final authority. However, in the results section we test whether such negotiators engage in concessionary behavior.

[5] "Budgets set through a negotiation process" refers to the entire set of negotiated budgets, including those where agreement is reached and those where an impasse is resolved unilaterally.

The same concern for subordinate motivation that constrains how high superiors unilaterally set budgets in the unilateral condition also constrains how superiors act in budget negotiations. Specifically, subordinates are likely to view a high initial budget proposal or counteroffer from superiors as unreasonable, and the resulting negotiation process and budget as unfair. Such perceptions would be expected to have a negative impact on subordinate performance. Thus, superiors are not expected to engage in strategic selection of initial negotiation positions. In particular, we do not expect the initial negotiation positions of superiors to be significantly greater than y, the level superiors would set if they unilaterally set the budget.

From their initial negotiation positions, superiors are expected to make concessions in order to comply with social norms. Taken as a whole, this discussion suggests that negotiated budgets where residual authority rests with superiors will be less than budgets unilaterally set by superiors.

> **H2:** Budgets set through a negotiation process where superiors have final authority will be lower than budgets set unilaterally by superiors.

Now consider budgets set unilaterally by subordinates and negotiated budgets where subordinates have final authority. We expect that the incentive compensation contract specified in equation (1) will lead subordinates in both conditions to exploit their informational advantage and power (Pruitt and Carnevale 1993; Rubin and Brown 1975) to obtain budgets less than their performance capabilities. The issue is whether negotiated budgets differ from unilaterally set budgets.

Assume subordinates set budgets at z in the unilateral condition where z is based on both financial and behavioral factors.[6] Negotiation *per se* does not affect subordinates' economic incentives or alter the information known by subordinates in our setting (e.g., negotiation does not result in any beneficial informational transfer from superiors to subordinates). A pure economic perspective, therefore, suggests there will be no difference between unilaterally set and negotiated budgets.

A behavioral perspective, in contrast, suggests unilaterally set and negotiated budgets might differ. If subordinates do not anticipate the concessionary nature of negotiation, they will take initial negotiation positions approximately equal to z, the level preferred by subordinates when they unilaterally set the budget. In this situation, the final negotiated budgets will be greater than z if subordinates make concessions during the negotiation. On the other hand, if subordinates anticipate making concessions during negotiation, they are likely to take initial negotiation positions less than z. Whether this strategy results in budgets less than, equal to, or greater than z depends on several factors, including how extreme subordinates' and superiors' initial negotiation positions are and their respective concession rates.[7] Thus, we cannot predict how negotiated budgets where subordinates have residual decision authority will differ from budgets unilaterally set by subordinates. Instead, we provide an exploratory analysis.

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[6] Subordinates have an economic incentive to set the budget equal to zero. However, social norms and concern for fairness are expected to influence subordinates who unilaterally set budgets to set them at a level greater than zero.

Effect of negotiation structure on budget level. One aspect of negotiation structure is whether superiors or subordinates make the initial budget proposal (Anthony and Govindarajan 1994). Negotiators are expected to set their initial proposals to influence negotiation outcomes in a direction consistent with their incentives. Prior research documents that initial proposals affect outcomes in the context of bilateral monopoly negotiations (Chertkoff and Conley 1967; Hinton et al. 1974; Neale and Bazerman 1991; Rubin and Brown 1975). Neale and Bazerman (1991) believe the negotiation outcomes are impacted by initial positions because negotiators anchor on the initial proposal in formulating counteroffers. If this anchoring effect holds in budget negotiations, budgets will be lower when subordinates make the initial budget proposal than when superiors make the initial budget proposal.

> **H3:** Negotiated budgets will be lower when subordinates make the initial budget proposal than when superiors do.

Negotiation Agreement

Agreement is a fundamental aspect of negotiation (Tripp and Sondak 1992). Prior negotiation research has shown that the failure to reach negotiation agreement can be costly (Tripp and Sondak 1992). We expect budget agreement to be associated with slack and subordinate performance. Consequently, it is important to understand the factors that affect budget agreement.

We assume in our setting that subordinates prefer low budgets and that they have a maximum threshold budget level that is barely acceptable. We also assume that superiors prefer high budgets and that they have a minimum threshold budget level that is just acceptable. The overlap between these minimum and maximum budgets is the superiors' and subordinates' zone of agreement (Pruitt and Carnevale 1993; Raiffa 1982). If there is no zone of agreement, there are no mutually acceptable budgets and superiors and subordinates can not reach agreement on a budget. On the other hand, if there is a zone of agreement, superiors and subordinates can agree on a budget.

Negotiators' initial positions are expected to affect agreement. Differences between initial budget proposals and subsequent initial counteroffers are expected to be associated with agreement for at least three reasons. First, a larger difference increases the likelihood that a zone of agreement does not exist. Second, even if a zone of agreement exists, budget negotiations do not last indefinitely. A larger difference implies that before negotiations enter the zone of agreement, there is a larger difference for superiors and subordinates to resolve within the constraints of the negotiation. Third, negotiators are likely to perceive less (more) extreme initial positions as cooperative (competitive) behavior (Benton et al. 1972; Pruitt and Carnevale 1993). The norm of reciprocity suggests that negotiators are more likely to respond cooperatively when faced with cooperative opponents, but more likely to respond competitively when faced with competitive opponents (Benton et al. 1972; Morris et al. 1995; Pruitt and Carnevale 1993).[8] That is, cooperative (competitive) behavior generally induces reciprocal cooperative (competitive) behavior, increasing (decreasing) the likelihood of inducing counteroffers that enter the zone of agreement.

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[7] Consider the following situations: First, superiors make larger concessions than subordinates anticipated. If subordinates want to avoid violating the social norm of reciprocity, they may match the superiors' concessions. This behavior will cause subordinates to make larger concessions than initially planned, leading to budgets greater than z. On the other hand, if subordinates do not match the superiors' concessions and, instead, continue making the concessions initially planned, budgets will be less than z. Second, superiors may fail to reciprocate the subordinates' concessions. This behavior may cause subordinates to feel justified in making smaller concessions than initially planned (or even no concessions), leading to budgets less than z. Third, superiors may unexpectedly accept budgets below z.

> **H4:** Differences between initial budget proposals and subsequent initial counteroffers will be smaller when negotiations end in agreement than when they do not.

Negotiation research generally indicates that individual factors are not useful predictors of negotiation outcomes (Neale and Bazerman 1991; Lewicki et al. 1994; Herman and Kogan 1977). Nonetheless, we provide an exploratory analysis to determine whether selected individual factors are associated with negotiation agreement. We also provide an exploratory analysis of how two aspects of negotiation structure—(1) which party makes the initial budget proposal and (2) which party has final authority—affects the likelihood of agreement.

Economic Consequences of Budget-Setting Process When Superiors have Power

We expect budgetary slack and subordinate performance to differ across budget-setting processes. In this section, we compare budgetary slack and subordinate performance in three different budget settings: (1) budgets set unilaterally, (2) budgets set through a negotiation process that ends in agreement, and (3) budgets set through a negotiation process that does not end in agreement.

When superiors have the power to set budgets in the event of a negotiation impasse, subordinates presumably will not agree to budgets unless they perceive the budgets to be attainable and are committed to attaining the budgets. On the other hand, if subordinates perceive superiors' final budget proposals to be unreasonably high, subordinates will reject the budgets and have a relatively low level of commitment to that budget level. It follows that when superiors have final authority in budget negotiations, negotiations that end in agreement signal budgets that are lower and more attainable—implying higher slack—than negotiations that do not end in agreement. Also, negotiations that end in agreement signal higher subordinate commitment and performance than negotiations that do not end in agreement.

When superiors unilaterally set budgets, they do not have the opportunity to obtain information from subordinates about their performance capabilities. This implies that some budgets are likely to be above subordinates' performance capabilities and that the subordinate commitment to such budgets will be small. Thus, budgetary slack and subordinate performance are expected to be lower when superiors unilaterally set the budgets than when budgets are negotiated, the superiors have residual decision authority, and the negotiation ends in agreement.

> **H5a:** Budgetary slack will be higher when superiors have final authority in the negotiation process and the process ends in agreement than when superiors have final

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[8] We expect that perceptions of either cooperative or competitive behavior will impact the negotiation process. Cooperative behavior is similar to the concept of altruism, which is positively associated with negotiation agreement in repeated prisoners' dilemma games (Andreoni and Miller 1993). If a negotiator perceives the other negotiator to be altruistic, the former is more likely to make reasonable bids and give concessions with the expectation that the latter will reciprocate.

authority and the negotiation process does not end in agreement or when superiors unilaterally set budgets.

H5b: Subordinate performance will be higher when superiors have final authority in the negotiation process and the process ends in agreement than when superiors have final authority and the negotiation process does not end in agreement or when superiors unilaterally set budgets.

Subordinates are likely to perceive both budgets set by superiors following a failed negotiation and budgets set unilaterally by superiors to be at unreasonably high levels. It is impossible to predict *ex ante* how budget levels and subordinate performance will differ across these two conditions. Instead, we provide an exploratory analysis.

III. METHOD

Subjects and Design

Subjects for the laboratory experiment were 185 undergraduate students enrolled in intermediate accounting, and they were assigned to one of six treatments based on time availability. There were three treatments where superiors had relatively more power in the budget-setting process: (1) superiors unilaterally set the budget, (2) a negotiation process where superiors both made the initial budget proposal and had final authority in the event of a negotiation impasse, and (3) a negotiation process where subordinates made the initial budget proposal and superiors had final authority. There were three similar conditions where subordinates had relatively more power. Subjects completed the entire experiment, except for the negotiation process, via computer.

Procedure

The experimental procedure consisted of the following steps:

1. The computer lab was partitioned into two halves using a solid room partition. When subjects arrived, they were randomly assigned to a computer terminal, with half (i.e., subordinates) seated on one side of the partition and half (i.e., superiors) on the other side. Subordinates and superiors were matched anonymously.[9]
2. The first few computer screens explained the production task, which was adapted from Chow (1983) and involved decoding numbers into letters. Subjects were issued a file folder containing a different decoding key for each session. All subjects then completed a five-minute practice session to ensure they understood the basic task.
3. Subordinates next completed three five-minute training sessions to learn their performance capabilities. They earned two cents for each item correctly decoded and received a running total of the number of items correctly and incorrectly decoded. After each session, subordinates received individual summary information on the number of items attempted, correctly decoded, and incorrectly decoded. Superiors also completed three five-minute practice sessions to familiarize them with the task. However, they were neither paid nor given feedback so that knowledge of their

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[9] Because there was no explicit role for superiors in the condition where subordinates unilaterally set the budget, all subjects in that condition assumed the role of subordinate. These subjects were, however, told that subjects on the other side of the partition were superiors. The result of matching superiors and subordinates was to reduce the 185 subjects to 70 superior-subordinate negotiation dyads, 15 superior-subordinate dyads where superiors unilaterally set the budget, and 15 subordinates who unilaterally set their own budget, for a total of 100 observations.

own performance capabilities would not affect the subsequent budget-setting process.

4. Subordinates were asked after the last training session for their best estimate of the number of items they could correctly decode in five minutes. This estimate was later used to calculate budgetary slack.
5. The next computer screens described the subordinates' and superiors' respective compensation schemes for the work session. Their contracts are described in equations (1) and (2), respectively, with $F = \$1.00$, $A = \$0.05$, $D = \$0.08$, and $R = 100$ percent.[10] Both compensation schemes were illustrated to all subjects through several numerical examples.
6. The budget-setting process was explained next. Subjects in the negotiation cells were told who would make the initial budget proposal (superiors or subordinates), who had final authority, and that the negotiation would last a maximum of four rounds. Subjects in the unilaterally set cells were told who would set the budget.
7. Subjects next answered a series of factual questions about the subordinate and superior compensation schemes and the budget-setting process. An incorrect answer on any question returned subjects to the explanatory computer screens and then back to the questions. These forced manipulation checks ensured that subjects understood both the compensation schemes and budget-setting process before beginning the budget-setting process.
8. Superiors and subordinates were given average performance information for the third training session, based on the performance of 25 people drawn from the same population as the subjects. The average was 70.2 decoded correctly, and all subjects were aware that both superiors and subordinates received this information. Thus, superiors knew the average performance capability for subordinates but not for their specific subordinate, whereas subordinates knew both their own and average performance capabilities.
9. Superiors or subordinates—as appropriate—set the budget in the unilateral condition. Subjects in the negotiation conditions began negotiations. To control for interpersonal factors, superiors and subordinates were separated by a room partition and conducted negotiations on a negotiation form (rather than face-to-face). In the negotiations, subjects who made the initial proposal wrote a budget target on the negotiation form. The administrator took the form to the other member of the dyad, who then wrote a counteroffer. An offer and counteroffer constituted one round. An equal offer and counteroffer indicated agreement and ended the negotiation. If negotiation dyads failed to reach agreement within four rounds, the party who had final authority set the budget.
10. Once the budget was set, subordinates completed a five-minute work session. Afterwards both members of a dyad learned the subordinate's performance in the work session and completed an exit questionnaire. Payments were then calculated and disbursed.

Measures

FORECAST is the subordinates' performance estimate of the number of items they could correctly decode in five minutes. Subjects made this estimate after the last training session. BID and COUNTER are the initial budget proposal and the initial counteroffer, respectively, made in the negotiations. AGREE is whether the negotiation dyad reached agreement. BUDGET is the final budget, and SLACK is measured as FORECAST minus BUDGET. PERFORM is the number of items subordinates correctly decoded in the work session.

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[10] The minimum compensation for subordinates was F. To avoid superiors having to pay F from their own resources in the event firm revenues were less than F, all superiors were endowed with $1.00.

IV. RESULTS

Preliminary Analysis

The negotiation conditions can be classified into four categories based upon whether superiors or subordinates (1) make the initial budget proposals and (2) have final authority in the event of a negotiation impasse. Descriptive statistics for the four negotiation conditions are reported in Table 1. Table 1 reveals that FORECAST is quite similar across the four conditions, ranging from 61 (when superiors both make the initial budget proposal and have final authority) to 63 (when superiors make the initial proposal and subordinates have final authority). Consistent with superiors' and subordinates' respective economic incentives, BID (COUNTER) is higher (lower) when superiors make the initial budget proposals. Which negotiator has final authority appears to affect BUDGET, SLACK and PERFORM, whereas which negotiator makes the initial budget proposal does not. We examine these variables more closely in our tests of hypotheses.

We also collected information from subjects in all six budget-setting conditions that is not summarized in Table 1. As a check on our experimental manipulation, we assess subjects' perceptions of their power to influence the final budget. Subjects perceive they possess significantly more power to influence the final budget when they unilaterally set the budget or have final authority in the negotiation than when they do not unilaterally set the budget or have final authority. We also assess the change in subordinate performance between the second and third training sessions and tests indicate no significant change. This lack of improvement suggests that learning curve effects should not affect the results. Finally, we measure subjects' performance capability using their performance in the third training session. There is no significant difference across (1) the six different budget-setting processes, or (2) negotiation outcomes (agreement/impasse). Tests using FORECAST yield the same conclusion. These results suggest that performance capability is successfully randomized across all budget-setting processes and across negotiation agreement/impasse.

Tests of Hypotheses

Effect of Negotiation

Negotiation behavior. Hypothesis 1 states that the initial negotiation position of negotiators who have final authority will be more extreme than the final budget. Negotiators' initial budget positions are BID if they made the initial budget proposal or COUNTER if they did not. Accordingly, we measure the extremity of negotiators' initial negotiation positions relative to the final budgets by calculating the difference between BID or COUNTER—whichever is appropriate—and BUDGET. Because the expected sign of this difference depends on whether superiors or subordinates have final authority, we measure the difference as (1) BID − BUDGET (COUNTER − BUDGET) when superiors have final authority and superiors (subordinates) make the initial budget proposal, and (2) BUDGET − BID (BUDGET − COUNTER) when subordinates have final authority and subordinates (superiors) make the initial budget proposal. Hypothesis 1 implies that the mean difference should be positive.

TABLE 1
Mean (Standard Deviation) for Key Experimental Variables by Negotiation Process by Condition

	Final Budget Authority		
	Subordinate	*Superior*	*Overall*
Makes Initial Budget Proposal			
Superior			
N/# of Dyads	38/19	30/15	68/34
FORECAST	63.00 (4.27)	61.00 (4.68)	62.12 (4.50)
BID	79.95 (16.26)	84.61 (21.87)	82.00 (18.78)
COUNTER	44.74 (23.97)	48.67 (15.64)	46.47 (20.52)
BUDGET	46.21 (27.54)	65.93 (18.23)	54.91 (25.56)
SLACK	16.79 (27.73)	−4.93 (18.39)	7.21 (26.13)
PERFORM	65.16 (3.34)	59.87 (14.19)	62.82 (9.93)
% of Dyads Agreeing	57.89	66.67	61.76
Subordinate			
N/# of Dyads	42/21	30/15	72/36
FORECAST	62.10 (4.50)	62.93 (4.71)	62.44 (4.54)
BID	34.86 (20.93)	47.40 (11.10)	40.08 (18.41)
COUNTER	71.48 (18.96)	82.27 (16.45)	75.97 (18.50)
BUDGET	42.43 (20.70)	66.73 (9.15)	52.55 (20.64)
SLACK	19.67 (21.10)	−3.80 (10.60)	9.89 (20.91)
PERFORM	65.14 (4.63)	56.87 (19.93)	61.69 (13.72)
% of Dyads Agreeing	71.43	33.33	55.56

(*Continued on next page*)

TABLE 1 (Continued)

	Final Budget Authority		
	Subordinate	*Superior*	*Overall*
Overall			
N/# of Dyads	80/40	60/30	140/70
FORECAST	62.53 (4.36)	61.97 (4.72)	62.29 (4.49)
BID	56.28 (29.44)	66.00 (25.46)	60.44 (28.03)
COUNTER	58.78 (25.15)	65.47 (23.25)	61.64 (24.41)
BUDGET	44.23 (23.95)	66.63 (14.18)	23.70 (23.02)
SLACK	18.30 (24.19)	−4.37 (14.76)	8.59 (23.45)
PERFORM	65.15 (4.01)	58.37 (17.07)	62.24 (11.96)
% of Dyads Agreeing	65.00	50.00	58.57

FORECAST = subordinates' performance estimate of the number of items they could correctly decode in five minutes;
BID = initial budget proposal made by the party who starts the negotiation;
COUNTER = first counteroffer made by the party who does not start the negotiation;
BUDGET = final budget;
SLACK = FORECAST − BUDGET; and
PERFORM = number of items subordinate correctly decoded in the five-minute work session.

The mean difference is 10.00, which is significantly greater than zero ($t = 6.05$; $p < 0.01$).[11] This result supports H1.[12] Post-hoc tests using Bonferroni's procedure for multiple comparisons to determine the adjusted p-values (Lindman 1992) indicate that this result holds both when subordinates have final authority ($t = 2.34$; adjusted $p < 0.03$) and when superiors do ($t = 7.71$; adjusted $p < 0.01$). The average concession of 4.68 units by subordinates and 17.10 units by superiors indicates that both subordinates and superiors make concessions in negotiation even when they have the power not to do so. The existence of such concessions is consistent with subordinates and superiors both adhering to social norms. In addition, the significantly larger concessions for superiors ($t = 4.12$; $p < 0.01$) could suggest that information transfer from subordinates to superiors occurs during the negotiation.

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[11] Unless otherwise indicated, all p-values are one-tailed.

[12] We conduct a similar analysis for negotiators who did not have final authority. The mean difference is 25.71, which is significantly greater than zero ($t = 9.24$, $p < 0.01$). This mean difference is significantly greater than the mean difference reported in the H1 results suggesting that those with power make concessions in negotiation, but do so to a lesser extent than those who do not have power.

Effect of negotiation on budget level. Hypothesis 2 states that budgets set through a negotiation process where superiors have final authority will be lower than budgets set unilaterally by superiors. This hypothesis is predicated on two conditions: (1) superiors will take initial negotiation positions that are not inflated by anticipated concessions and (2) superiors will make concessions during the negotiations due to social norms and/or information transfer. Comparing superiors' initial budget negotiation proposals to the budgets superiors set unilaterally provides evidence related to the first condition. BUDGET is 86.67 when superiors unilaterally set it, and BID is 84.61 when superiors make the initial budget proposal and have final authority. This difference is not significant ($t = 0.28$; $p < 0.78$, two-tail), suggesting that superiors do not take strategic initial negotiation positions. The test of H1 provides evidence that superiors make concessions in the negotiation process. Thus, the two preconditions upon which H2 rests exist within our setting. A direct test also supports H2. In particular, BUDGET is 66.63 for the negotiation process vs. 86.67 for the unilateral process. These values for the final budget level are significantly different from each other ($t = 3.74$; $p < 0.01$).

The effect of negotiation on budget levels when subordinates have power is exploratory. BUDGET is 44.23 when set through a negotiation process vs. 52.86 when set unilaterally. These budget levels are not significantly different from each other at conventional levels ($t = 1.30$; $p < 0.20$, two-tail). Given that subordinates make concessions during negotiations (as discussed in the prior section), a possible explanation for no significant difference in the final budget is that subordinates choose initial negotiation positions significantly below their desired budget levels to create room for concessions. A comparison of subordinates' initial budget proposals in the negotiation (34.86) to the budgets subordinates set unilaterally (52.86) indicates a significant difference ($t = 2.87$; $p < 0.01$), consistent with subordinates strategically selecting initial positions.

The fact that superiors do not choose overstated initial negotiation positions while subordinates choose understated initial negotiation positions seems consistent with the nature of the information asymmetry between the superiors and subordinates in our experiment. Subordinates know that superiors' initial positions above the mean performance level are strategic choices because superiors have no knowledge of an individual subordinate's performance capability. Thus, subordinates immediately detect strategic initial positions made by superiors. Our results indicate that superiors are aware that their strategic behavior is detectable and they act as if the strategic selection of an initial position has a detrimental impact on the negotiation process. On the other hand, superiors do not know subordinate performance capabilities, so they cannot know whether a subordinate's below average initial negotiation position is a strategic choice or a statement that performance capability is below average. Our results suggest that subordinates are aware that superiors cannot determine whether their initial positions are strategic and they take advantage of this uncertainty by choosing initial negotiations positions strategically.

Effect of negotiation structure on budget level. Hypothesis 3 states that budgets will be lower when subordinates make the initial budget proposals than when superiors do. This hypothesis is predicated on: (1) initial budget proposals will be lower when subordinates make the initial budget proposals, and (2) superiors and subordinates will then anchor on the proposals. As expected, BID is significantly lower when subordinates make the initial bid than when superiors make the initial bid (40.08 vs. 82.00; $t = 9.34$; $p < 0.01$), providing support for the first condition. However, although the difference in BUDGET is in the predicted direction (52.55 vs. 54.91), the difference is not significant ($t = 0.43$; $p < 0.40$). Thus, the evidence does not support H3 and suggests that subjects do not anchor on initial budget proposals in their negotiations.

Negotiation Agreement

Hypothesis 4 states that the difference between initial budget proposals and subsequent counteroffers will be smaller for negotiations that end in agreement. Because the expected sign of this difference depends on whether superiors or subordinates make the initial budget proposal, we measure the difference as BID − COUNTER when superiors make the initial budget proposal and as COUNTER − BID when subordinates make the initial proposal. The difference is 26.46 for negotiation dyads that reach agreement vs. 48.79 for negotiation dyads that do not. The difference is significant ($t = 3.99$; $p < 0.01$), supporting H4.

Although individual differences generally are not useful for predicting negotiation outcomes (Neale and Bazerman 1991; Lewicki et al. 1994; Herman and Kogan 1977), we provide an exploratory analysis of the following demographic variables: negotiation dyad's combined age, combined work experience, and combined G.P.A. None of these factors differ significantly across dyads that do and do not reach agreement (lowest $p > 0.81$, two-tail). In addition, as mentioned earlier, there is no significant difference across agreement conditions in either subordinate or superior performance in the third training session. Thus, consistent with findings from nonaccounting negotiation research, individual factors are not useful in predicting budget negotiation agreement.

Overall, 58.57 percent of the negotiation dyads reach agreement. Tests of differences in proportions (Agresti and Finlay 1986) indicate that the likelihood of dyads reaching agreement is not significantly affected by which party makes the initial budget proposal ($z = 1.27$; $p < 0.60$, two-tail) or has final authority ($z = 1.27$; $p < 0.20$, two-tail). However, whether the negotiation structure is pure (i.e., negotiators who make the initial proposal also have final authority) or mixed significantly affects the likelihood of agreement. In the pure negotiation structures, 69.44 percent of the dyads reach agreement, compared to only 47.06 percent in the mixed structures ($z = 1.95$; $p < 0.05$; two-tail). Thus, in this experiment, negotiation structure affects the likelihood of agreement.

Economic Consequences of Negotiation

Table 2 contains descriptive statistics for three conditions: (1) negotiation dyads that reach agreement, (2) negotiation dyads that do not reach agreement, and (3) dyads where the budget is set unilaterally.[13] Panel A contains data for cases in which superiors have budget-setting power, and Panel B contains data for cases in which subordinates have budget-setting power.

Hypothesis 5a (5b) predicts that slack (subordinate performance) will be higher when superiors have final authority and the negotiation process ends in agreement than when there is no agreement or superiors unilaterally set budgets. We also conduct an exploratory analysis of slack (subordinate performance) across nonagreement and unilateral conditions. We use Bonferroni's procedure to control the overall alpha level and determine the adjusted p-values (Lindman 1992). SLACK is 1.73 for negotiations ending in agreement, −10.47 for negotiations not ending in agreement, and −23.40 when superiors unilaterally set the budget. SLACK is significantly greater in the agreement condition than in either the nonagreement condition ($t = 2.45$; adjusted $p < 0.04$) or the unilateral condition ($t = 4.18$; adjusted $p < 0.01$). These results support H5a and that the existence and outcome of negotiation (agree/impasse) affect budgetary slack. SLACK is not significantly different in the nonagreement condition and unilateral condition ($t = 1.76$; adjusted $p < 0.30$, two-tailed).

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[13] The party making the initial budget proposal does not significantly affect SLACK or PERFORM for negotiated budgets, so we do not report descriptive statistics partitioned by who makes the initial budget proposal.

TABLE 2
Mean (Standard Deviation) by Negotiation Agreement and Unilaterally-Set

Panel A: Superior Power

	Negotiation Dyads Agreed	*Negotiation Dyads Did Not Agree*	*Overall Negotiation Process*	*Superior Unilaterally Sets Budget*
N	30	30	60	30
# of Dyads	15	15	30	15
FORECAST	63.07	60.87	61.97	63.27
	(3.58)	(5.54)	(4.72)	(5.57)
BUDGET	61.33	71.33	66.63	86.67
	(8.83)	(16.88)	(14.18)	(18.48)
SLACK	1.73	−10.47	−4.37	−23.40
	(7.39)	(17.80)	(14.76)	(22.11)
PERFORM	64.87	51.87	58.37	64.20
	(4.10)	(22.27)	(17.07)	(5.28)

Panel B: Subordinate Power

	Negotiation Dyads Agreed	*Negotiation Dyads Did Not Agree*	*Overall Negotiation Process*	*Subordinate Unilaterally Sets Budget*[a]
N	52	28	80	15
# of Dyads	26	14	40	N/A
FORECAST	62.27	63.00	62.53	62.47
	(4.79)	(3.55)	(4.36)	(3.93)
BUDGET	56.31	21.79	44.23	52.86
	(14.36)	(22.12)	(23.95)	(14.82)
SLACK	5.96	41.21	18.30	9.60
	(14.40)	(22.07)	(24.19)	(14.34)
PERFORM	65.12	65.21	65.15	64.60
	(4.40)	(3.33)	(4.01)	(3.14)

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[a] There was no role for superiors in the cell where the subordinate unilaterally set the budget. Thus, all subjects in that cell were assigned the role of subordinate.

All variables are defined in Table 1.

PERFORM is 64.87 for negotiations ending in agreement, 51.87 for negotiations not ending in agreement, and 64.20 when superiors unilaterally set the budget. PERFORM is significantly greater in the agreement condition than in the nonagreement condition ($t = 2.22$; adjusted $p < 0.05$), but is not significantly different in the agreement and unilateral conditions ($t = 0.39$; adjusted $p < 0.95$). Thus, H5b is only partially supported.

The difference in PERFORM between the nonagreement and unilateral conditions is not significant ($t = 2.09$; adjusted $p < 0.14$, two-tail). Superiors impose a budget in both the nonagreement and unilateral conditions. We conducted a second test using an ANCOVA with budget level as the covariate to determine whether the circumstances of an imposed budget (i.e., following a failed negotiation vs. as standard procedure) affects performance, independent of the effect of the budget level imposed. After controlling for the significantly larger budgets in the unilateral condition ($p < 0.02$, two-tail), PERFORM is significantly lower in the nonagreement condition than in the unilateral condition ($F = 9.88$; adjusted $p < 0.02$, two-tail).

These results suggest that a failed negotiation followed by superiors imposing a budget has a significant demotivating influence. Procedural justice (see, e.g., Lindquist 1995) provides a possible explanation for this demotivating effect. The "fair process effect" (Folger 1977) suggests that using a fair process to determine outcomes may increase subordinates' perceptions of the fairness of the outcomes, which in turn may increase satisfaction and performance. From this perspective, subordinates may perceive having superiors impose a budget following a failed negotiation to be unfair. Negotiation appears to give subordinates both a voice and a vote in setting the budget, which gives subordinates a high degree of perceived process control (Lindquist 1995), and then superiors take away this perceived influence or control by imposing a budget.

For completeness, we also test for differences across conditions when subordinates have final authority. SLACK (PERFORM) is 5.96 (65.12) for negotiations ending in agreement, 41.21 (65.21) for negotiations not ending in agreement, and 9.60 (64.60) when subordinates unilaterally set the budget. The only significant differences are for SLACK. SLACK is significantly greater in the nonagreement condition than in either the agreement condition ($t = 5.39$; adjusted $p < 0.01$, two-tail) or the unilateral condition ($t = 4.54$; adjusted $p < 0.01$, two-tail). It is not surprising that PERFORM does not differ across these three conditions because the budget is below performance capability in all subordinate power cells.

V. DISCUSSION AND CONCLUSION

This paper examines whether budgets and the economic consequences of the budget-setting process—budgetary slack and subordinate performance—differ when budgets are set through a negotiation process vs. when set unilaterally. The paper also considers (1) the relation between negotiation agreement and the economic consequences, and (2) factors associated with whether negotiation agreement occurs.

Budgets set through a negotiation process where superiors have final authority are significantly lower than budgets set unilaterally by superiors, whereas budgets set through a negotiation process where subordinates have final authority are not significantly different from budgets set unilaterally by subordinates. This is due to superiors and subordinates approaching budget negotiations differently. Subordinates act strategically in the negotiation by taking low initial negotiation positions and then making concessions. This strategy allows them to conform to social norms while also enabling them to negotiate budgets not significantly different from their desired budgets (i.e., the unilaterally set budgets). On the other hand, superiors act relatively "nonstrategically" by taking initial negotiation positions not significantly different from their desired budgets and then making concessions. This strategy causes superiors to negotiate budgets significantly lower than the unilaterally set budgets. Such differences in behavior are consistent with the asymmetric information that superiors and subordinates have about subordinate performance capabilities. Any strategic initial position of superiors is transparent to subordinates, but strategic behavior of subordinates is not transparent to superiors.

Initial negotiation positions also affects the likelihood of negotiation dyads reaching agreement. The difference in negotiators' initial positions is significantly smaller for dyads that reach agreement than for those that do not. In turn, negotiation agreement is an important factor in understanding the economic consequences of the budget-setting process. Agreement is associated with the amount of slack in the budget because, when superiors have final authority, agreement by subordinates is more likely to occur if the budgets are lower and more attainable. When subordinates have final authority, agreement by superiors is more likely to occur when the budgets are higher. Thus, we find the absolute value of slack is significantly less for negotiations ending in agreement, which means that negotiation agreement is associated with budgets closer to subordinates' performance capabilities. Interestingly, the only negotiation condition in which subordinate performance is significantly different is when superiors have final authority in the negotiation and the negotiation does not end in agreement. Procedural justice provides a possible explanation for the demotivating effect caused by superiors imposing a budget following a failed negotiation.

These results have several implications. First, the process used to set budgets can significantly affect budgets and the economic consequences of the budget-setting process. This suggests that the results of prior budgeting studies in which subordinates unilaterally set their own budgets may not be generalizable to the most common external setting in which budgets are established by a negotiation process. For example, contrary to findings in previous studies (e.g., Chow et al. 1988; Waller 1988), our results suggest there may not be a significant difference in slack across truth-inducing and slack-inducing contracts if budgets are set through a negotiation process where superiors have final authority. Our results also suggest that when evaluating different budget-setting processes, companies should not base their decisions solely on budgetary slack because slack is only one economic consequence of the budget-setting process. Companies should consider the effect of their budget-setting process on both budgetary slack and subordinate performance.

Second, some differences between negotiated and unilaterally-set budgets are due to factors unique to the negotiation process, such as negotiators' initial positions, negotiation social norms, and the opportunity negotiation creates for information transfer between negotiators; whereas some differences are related to negotiation agreement. Given the importance of negotiators' initial positions and negotiation agreement, research on factors associated with initial negotiation positions and/or negotiation agreement in budget negotiations is warranted. Our study provides at least one direction for this future research. We find that agreement is significantly more likely to occur if the person with the final authority over budget level in the event of a negotiation impasse also makes the initial budget proposal.

This study has several limitations. First, as with all laboratory experiments, the results depend on the specific experimental task, treatments, and parameter values used. Second, employment contracting is a market phenomenon whereby both employers and employees have input on the terms and conditions of employment. However, the contracts used in this study, although common in practice, were set exogenously. Third, to the extent that negotiation costs vary with the length of negotiation, the study ignores an economic consequence associated with negotiated budgets. Fourth, the average past subject performance revealed to subjects was higher than the average forecast made by the subordinates, even though the former was based on individuals drawn from the same population as the subjects. The difference is consistent across all experimental conditions and should not affect the results if the average performance information equally affected subjects' expectations. To the extent that subject expectations were unequally affected, the generalizability of some results may be limited. Fifth, superiors used budgets solely as an input into the subordinate's contract; superiors did not use budgets as a basis for resource allocations. Sixth, the experiment used one budgeting period. In most firms, budget setting is repeated over multiple periods. This paper ignores the potential interactions between periods. Finally, to control for a variety of factors, subjects could only communicate budget proposals via a form. In practice, however, budget negotiation often involves personal interaction between the negotiators and greater information exchange (e.g., justification for the proposed budget or a reason for rejecting a proposed budget).

There are many other avenues for future research on budget negotiations. Research suggests that a variety of environmental and individual factors held constant in the current study may affect the negotiation process and, in turn, the economic consequences of negotiated budgets. Environmental factors include superiors' and subordinates' respective compensation schemes (Baiman 1982; Waller 1988), the degree of information asymmetry between superiors and subordinates (Chow et al. 1988; Young 1985), whether the setting is single or multiperiod (Chow et al. 1991), and whether subordinate performance is subject to noncontrollable influences. Potential individual factors include risk preferences (Baiman 1982; Waller 1988), susceptibility to social influences (Frederickson and Cloyd 1998; Young 1985), and personality variables (see, e.g., Brownell 1981; Chenhall 1986; Locata et al. 1986). The demotivating effect of superiors imposing a budget following a failed negotiation also suggests that research on the role of procedural justice in budget negotiations could be fruitful.

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Rate Regulation, Competition, and Loss Reserve Discounting by Property-Casualty Insurers

Karen K. Nelson
Stanford University

ABSTRACT: This study examines whether the reported loss reserves of property-casualty insurers contain an implicit discount for the time value of money. Reporting the present value of loss reserves enables insurers to justify the competitive level of insurance premiums to regulators. The evidence indicates that there is a positive and significant discount rate implicit in the relation between reported loss reserves and expected future claim payments. Moreover, insurers subject to relatively stringent rate regulation discount to a greater extent than do other insurers. The results also suggest that implicit discounting is distinct from solvency and tax motives to exercise discretion over the loss reserve.

Key Words: *Discretionary accruals, Present value, Loss reserves, Property-casualty insurance.*

Data Availability: *The data used in this study are from the public sources identified in the text.*

I. INTRODUCTION

This paper examines whether managers of property-casualty (P&C) insurers exercise their accounting discretion to report loss reserves at the present value of expected future claim payments rather than at the nominal value prescribed by regulatory accounting standards. Whether insurers manage loss reserves in this manner has generated considerable discussion, but little agreement. For example, based on anecdotal evidence,

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Lowe and Philbrick (1986, 78) claim that the implicit discounting of loss reserves has become "virtually institutionalized," although Brown (1993, 138) maintains that it is "not a widely adopted practice."

Determining if discounting plays a role in the systematic understatement of loss reserves by the P&C industry (documented, for example, by A. M. Best [1994]) is important because it is likely to affect how regulators, policyholders, and other interested parties evaluate and interpret insurers' operating results. Although I examine the discounting of loss reserves in statutory accounting reports, this research also has implications for financial statements prepared in accordance with Generally Accepted Accounting Principles (GAAP). The Securities and Exchange Commission (SEC) allows GAAP reserves to be discounted only if they have been explicitly discounted for regulatory purposes (Herz et al. 1997).[1] Consequently, evidence that insurers implicitly discount statutory reserves implies that GAAP reserves are also implicitly discounted. Consistent with this proposition, Beaver and McNichols (1998) and Petroni and Wahlen (1995) observe an equity valuation coefficient on GAAP loss reserves that is indistinguishable from -1, the value expected if loss reserves are stated at present value.

I argue that rate regulation and competition in the P&C industry create an incentive for insurers to report the economic (present) value of loss reserves reflected in competitive insurance premiums. Using data from the 1989–1993 statutory annual reports of 755 P&C insurers, I project the amount and timing of future claim payments for each insurer in the sample. In the absence of managerial discretion, these payments should sum, with error, to the reported loss reserve. Instead, evidence from nonlinear least squares estimations indicates that there is a positive and significant discount rate implicit in the relation between insurers' reported loss reserves and expected future claim payments. Furthermore, insurers subject to relatively stringent rate regulation discount at a higher rate of interest than do those operating primarily in lenient jurisdictions. Taken together, these findings support the assertion that insurers discount reported loss reserves in response to rate regulation and competition in the P&C industry.

Additional analysis reveals that the difference between my empirical estimate of nominal loss reserves and the reserve actually reported by insurers is increasing in the length of the settlement period, but at a decreasing rate. The concavity of the reserve error implied by this result is further evidence that insurers implicitly discount reported loss reserves. Moreover, because the inferences drawn from the alternative approaches are consistent, it is unlikely that the findings are attributable to the choice of empirical specification.

I also investigate whether implicit discounting is distinct from the well-documented tendency of financially distressed insurers to understate loss reserves relative to healthy insurers (e.g., Petroni 1992). The evidence indicates that both healthy and distressed insurers discount loss reserves, but that distressed insurers discount at a higher rate of interest. Thus, reserve management to meet solvency requirements plays an incremental role in insurers' reserving decisions. Similarly, there is some evidence that insurers with a high marginal tax rate discount at a lower rate than other insurers, consistent with management of the reserve estimate to reduce taxes.

This study makes the following contributions to the literature on financial reporting of P&C loss reserves. In contrast to prior research that focuses on managers' use of reporting discretion to conceal financial distress and reduce taxable income, I investigate rate regulatory incentives for reserve management. Loss reserves are a critical input to the ratemaking process (Brown 1993; Webb et al. 1992), yet little is known about how rate regulation affects insurers' reserve estimates. This study is also the first to report direct empirical evidence that insurers understate loss reserves through an implicit present-value calculation. Finally, I develop an *ex ante* model of reserve management rather than rely on required disclosures of revisions in loss reserve estimates to calculate an *ex post* measure of managers' discretion.

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[1] Insurers must reconcile the statutory loss reserve to the GAAP reserve in filings with the SEC. The difference between statutory and GAAP reserves is typically minor, consisting primarily of estimated amounts for the salvage value of damaged property and the recovery of damages from third parties (AICPA 1994).

This study is also related to the literature on the incentive effects of rate regulation in the electric utility industry. Unlike P&C insurers, utilities have operated as monopolies for most of this century. The evidence suggests that, absent competition, utility managers have incentives to report cost-inflating discretionary accruals to increase electricity rates (e.g., Jarrell 1979; D'Souza 1998). In contrast, I find that P&C managers use their accounting discretion to reduce reported costs. My results are of particular interest in light of recent efforts to open utility markets to competing suppliers (see D'Souza [1998] for a discussion).

The next section of the paper describes statutory accounting for loss reserves. I develop the research hypotheses in Section III, and the empirical methodology in Section IV. Section V contains sample selection procedures and descriptive statistics. Section VI reports the primary findings. Sensitivity tests are discussed in Section VII. Section VIII provides a summary and concluding remarks.

II. MEASUREMENT AND REPORTING OF THE LOSS RESERVE ESTIMATE

Statutory accounting practices require insurers to charge claim losses to operations in the period in which they are incurred, even though many years may elapse before the claims are actually paid. As a result, insurers must estimate the amount required to settle the incurred but unpaid claims, including direct expenses associated with the claims settlement process (e.g., litigation costs). This liability, known as the loss reserve, should be reported at nominal value in the insurer's statutory annual statement filed with state insurance regulators.[2] The loss reserve is revised as new information becomes available, until all claims are settled and total incurred losses are known with certainty.

The difference between the loss reserve reported in any given period and the amount eventually required to settle the claims, known as the loss reserve development, indicates the estimation error in the originally reported reserve. Petroni and Beasley (1996) report that more than 90 percent of the insurer-years in their sample exhibit material estimation errors. Although such errors are at least partially the result of unanticipated economic factors, there is considerable evidence that insurers intentionally bias reported loss reserves (e.g., Beaver and McNichols 1998; Petroni 1992). Furthermore, neither regulators (Petroni 1990) nor auditors (Petroni and Beasley 1996) appear to be effective in detecting and/or mitigating this managerial discretion.

The traditional justification for requiring loss reserves to be recognized at nominal value is twofold. First, nominal value provides a more conservative valuation of loss reserves and thus protects insurers' solvency. Second, the elapsed time between occurrence of a loss and payment of the resulting claims (called the settlement period or "tail") was historically very short, and thus regulators considered recognition of the time value of money to be unnecessary. However, settlement periods have increased substantially for many lines of P&C insurance in the past few decades, causing some to question whether the nominal value standard is still appropriate (e.g., Lowe and Philbrick 1986; Webb et al 1992).

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[2] According to the National Association of Insurance Commissioners' (NAIC) (1994, 10-1) *Accounting Practices and Procedures Manual*, "statutory accounting practices require that for every dollar of unpaid losses the company reserve a whole dollar for the future payment of those losses." More explicitly, "[p]resent value discounting of property and casualty loss reserves is not a generally accepted statutory accounting practice" (NAIC 1994, 10-3). The NAIC makes an exception to this rule for workers' compensation loss reserves related to pension and long-term disability benefits, and for insurers who receive authorization by their domiciliary state to discount the loss reserves for other lines of insurance.

Figure 1 illustrates the average settlement periods for the six lines of insurance examined in this paper: homeowners/farmowners multiple-peril (HM), private auto liability (PA), commercial auto liability (CA), commercial multiple-peril (CM), other liability (OL), and medical malpractice (MM).[3] Figure 1 reveals that there is substantial cross-sectional variation in settlement periods. For example, over 90 percent of all HM claims are settled

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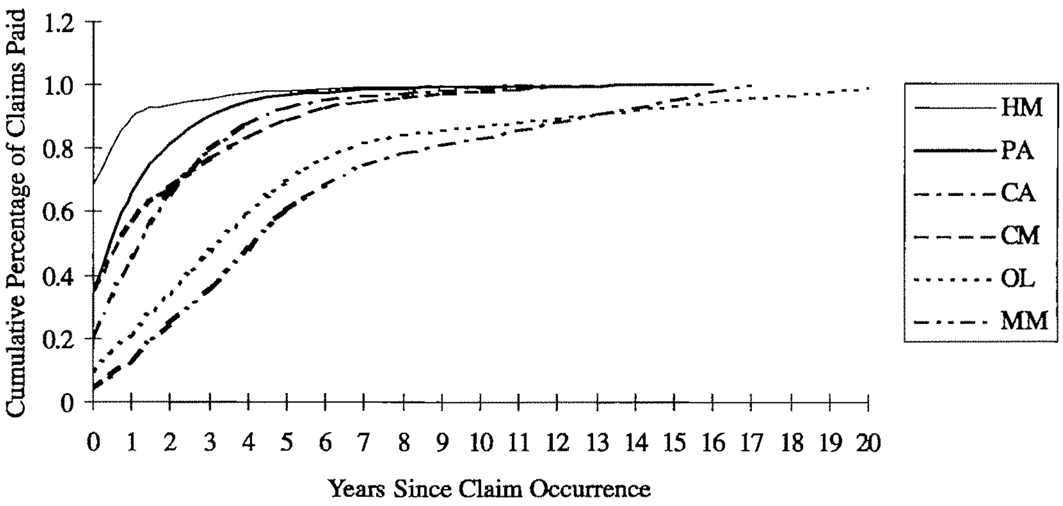
[3] I select these six lines because they have reasonably long settlement periods and because they are significant to most P&C insurers' operations. Further discussion of the sample and data is located in Section V.

FIGURE 1
Average Cumulative Percentage of Claims Paid by Development Year



The cumulative percentage of claims paid in development year 0 (1, etc.) is equal to the ratio of total losses paid to total losses incurred for the most recent (second most recent, etc.) accident year. The incremental percentage of losses paid in development year 9 is assumed to be paid in each subsequent year until all claims are settled. The sample consists of all insurer-year observations with the necessary data available in the 1989–1993 NAIC Property-Casualty Annual Statement Database. Observations are pooled across calendar years and aligned in event time, with year 0 indicating the year in which the claims were incurred.

The lines of insurance are defined as follows:

HM = homeowners/farmowners multiple-peril,
PA = private passenger auto liability,
CA = commercial auto liability,
CM = commercial multiple-peril,
OL = other liability, and
MM = medical malpractice.

within three years of occurrence, on average, compared to only one-third of MM claims. Moreover, the average settlement period ranges from seven years for HM to 20 years for MM.

The average settlement periods documented in Figure 1 suggest that the time-value component of loss reserves may be substantial. Figure 2 provides initial descriptive evidence on whether this discount is reflected in insurers' reported loss reserves. Specifically, Figure 2 plots the average ratio of originally reported loss reserves to management's revised estimate disclosed nine years subsequent to claim occurrence.[4] If the reported loss reserves are unbiased, this measure will be approximately equal to 1 in all development years. Instead, the evidence indicates that reported loss reserves are systematically understated. More importantly, the magnitude of the understatement increases with the length of the average settlement period, consistent with insurers implicitly discounting loss reserves to present value. The next section develops hypotheses to explain this reporting behavior.

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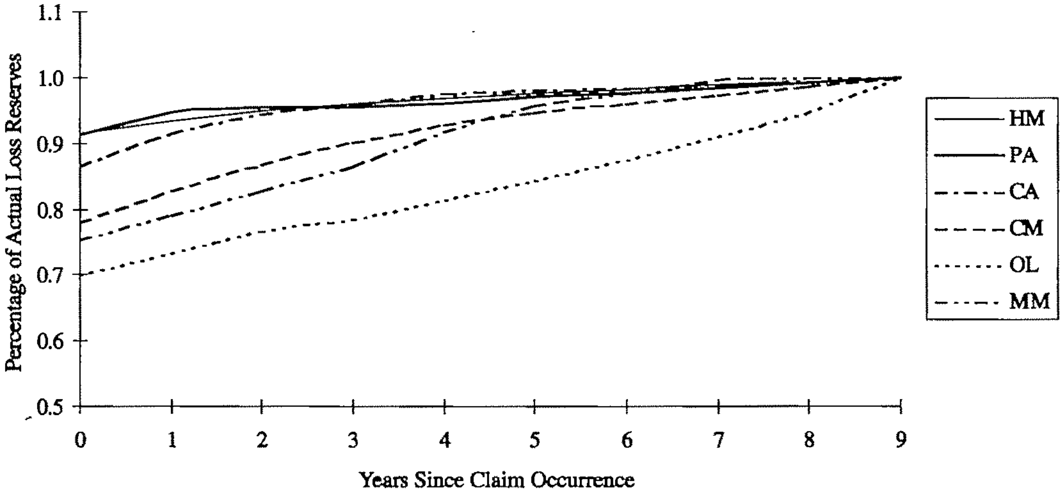
[4] The data underlying Figure 2 relate to loss reserves originally reported in 1980–1984 because these are the only observations in the database with nine years of loss-reserve development available. Untabulated findings indicate that the reserve development pattern is similar, although less pronounced, for each successive year in the database. Figure 2 excludes a limited number of insurers that explicitly discount reported loss reserves, identified by a reported time-value discount in the statutory annual statement.

FIGURE 2
Average Ratio of Reported Loss Reserves to Actual Loss Reserves



This figure depicts the average ratio of reported loss reserves to management's revised estimate disclosed nine years subsequent to claim occurrence. The sample consists of all insurer-year observations with the necessary data available in the 1989–1993 NAIC Property-Casualty Annual Statement Database, except for a limited number of insurers recognizing an explicit loss reserve discount. The data relate to loss reserves originally reported in calendar years 1980–1984 because these are the only years in the database with nine years of loss-reserve development available. Observations are pooled across calendar years and aligned in event time, with year 0 indicating the year in which the claims were incurred.
See Figure 1 for line-of-insurance definitions.

III RESEARCH HYPOTHESES

The considerable uncertainty and subjectivity inherent in estimating loss reserves permits insurers wide latitude in determining the measure to report. In this section, I argue that the combined impact of two attributes of the P&C industry, rate regulation and competition, creates an incentive for insurers to report the discounted value of loss reserves.

Rate Regulation

The McCarran-Ferguson Act of 1945 grants states the authority to regulate insurance rates. Although all states and the District of Columbia have statutes requiring rates to be adequate, but not excessive, in relation to insurers' expected future costs, the level of regulatory supervision varies across states as well as across product lines within a given state. The National Association of Insurance Commissioners (NAIC) classifies rating laws into the categories shown in Panel A of Table 1. Consistent with prior literature (see Harrington [1984] for a summary), I consider regulations to be relatively stringent if they require insurers to use rates approved or established by the state insurance department. By comparison, the remaining types of regulation are relatively lenient because they only require insurers to file rates with the insurance department, either prior to use ("file and use") or shortly thereafter ("use and file"), not to obtain specific prior approval. In limited instances, no filing is required.

Panel A also reports the number of states utilizing each type of rating law for the six lines of insurance examined in this paper. This summary shows that stringent and lenient regulatory methods are used with approximately equal frequency. Within each regime, one type of rating law dominates; "prior approval" is used by all but one state with stringent regulation, whereas "file and use" is employed by the majority of states with lenient regulation.

In practice, the distinction between stringent and lenient regulatory systems may be subtle. For example, even in a lenient regime, regulators have the authority to require insurers to withdraw rates that are either excessive or inadequate. Thus, insurers may voluntarily obtain prior approval even when not required by law (Webb et al. 1992, 158). In addition, many states with "file and use" laws require insurers to wait a specified period after filing before rates become effective. If closely monitored by the state, this type of regulation operates similar to a "prior approval" law (Meier 1988, 183). However, under the standard classification of rating regimes, "file and use" is considered lenient whereas "prior approval" is considered stringent.

Prior research generally finds no evidence that stringent rate regulation systematically inflates or suppresses insurance prices relative to the prices that exist in lenient environments (e.g., Harrington 1984, 615; Meier 1988, 157; Webb et al. 1992, 124). These studies typically deflate insurance premiums by total losses incurred (which includes the reserve estimate). However, this measure of price implicitly assumes that reported losses are uncorrelated with the regulatory environment, which is unlikely if insurers are able to affect the outcome of the rate-making process by managing the reserve numbers regulators use to evaluate rates. I discuss the specifics of the rate-making process below.

Competition

Unlike the traditional regulated monopoly, structural analysis of the P&C industry suggests that insurance markets are highly competitive. Specifically, there are a large number of insurers selling a relatively homogenous product, modest barriers to entry, minimal economies of scale, and low levels of market concentration (Cummins and Weiss 1991; Meier

TABLE 1
Regulatory and Competitive Environment

	HM	*PA*	*CA*	*CM*	*OL*	*MM*
Panel A: Summary of State Rate Regulations[a]						
Stringent:						
State made	0	1	1	0	0	1
Prior approval	22	24	24	23	22	24
	22	25	25	23	22	25
Lenient:						
Flex	0	0	2	3	3	2
File and use	19	16	15	16	17	16
Use and file	8	8	6	6	6	6
No file	2	2	3	3	3	2
	29	26	26	28	29	26
Total	51	51	51	51	51	51
Panel B: Herfindahl Index of Industry Concentration, 1989–1993 (n = 255)[b]						
Mean	791	823	286	253	364	2,735
Median	779	787	221	221	306	2,565
Std. Dev.	316	278	166	109	215	1,170
Min.	220	320	115	108	154	547
Max.	2,395	2,907	1,532	744	1,821	6,143
Panel C: Correlation Between Regulatory and Competitive Environment (n = 51)[c]						
1989	0.23*	0.23**	0.36***	0.29**	0.04	−0.07
1990	0.22*	0.18*	0.37***	0.27**	0.07	−0.04
1991	0.20*	0.21*	0.37***	0.31**	−0.08	−0.00
1992	0.19*	0.20*	0.37***	0.29**	−0.17	−0.00
1993	0.21*	0.18	0.36***	0.31**	−0.08	0.00

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*, **, *** indicate significance at the 0.10, 0.05, 0.01 level (one-tailed), respectively.

[a] State rate regulations are classified as follows (NAIC 1993):

State made: Rates are promulgated by the state insurance department, and all insurers must adhere to these rates. Companies provide the insurance department with the data necessary for the state to determine rates.

Prior approval: Rates must be filed with and approved by the state insurance department before they can be used. A filing may be deemed to have been approved after a certain number of days have passed.

Flex: Prior approval of rates required only if they exceed a certain percentage above or below the previously filed rates.

File and use: Rates must be filed with the state insurance department prior to their use. Specific approval is not required, but the state insurance department retains the right of subsequent disapproval.

Use and file: Rates must be filed with the state insurance department within a specified period after they have been placed in use.

No file: Rates are not required to be filed with or approved by the state insurance department. However, the insurer must maintain records of information used in developing the rates, and make them available to the state insurance department upon request.

(*Continued on next page*)

TABLE 1 (Continued)

[b] The Herfindahl Index for line l in state s is calculated as follows:

$$\sum_{i=1}^{n}[(dpw_{ils}/DPW_{ls}) \times 100]^2$$

where dpw_{ils} denotes line l direct premiums written by insurer i in state s, DPW_{ls} denotes the sum of line l direct premiums written by all insurers in state s, and n is the number of insurers. The sample consists of all insurer-year observations with the necessary data available in the NAIC Property-Casualty Annual Statement Database.

[c] Pearson product-moment correlations between regulatory environment, equal to 1 (0) for states with stringent (lenient) regulation, and competitive environment, as measured by the Herfindahl Index.

See Figure 1 for line-of-insurance definitions.

1988; Joskow 1973).[5] Greenwald (1996) suggests that price competition has been particularly intense since the late 1980s.

Panel B of Table 1 reports summary statistics for the Herfindahl Index (HI) of market concentration, calculated at the state level for each line of business. The HI can vary from 0 (perfectly competitive) to 10,000 (monopoly), with a measure greater than 1,800 suggesting a market with reduced rivalry (Oster 1994, 36). Consistent with prior research, the results indicate that P&C insurance markets are relatively unconcentrated. With the exception of MM, the mean and median HI are well below the benchmark level for competitive markets. MM is substantially more concentrated than the other lines of insurance, with a mean (median) HI of 2,735 (2,565).

Competition may be less intense in stringently regulated markets, either because state legislators enact stringent regulation in response to reduced competition, or because insurers withdraw from markets with stringent regulation. The correlations reported in Panel C of Table 1 generally support this conjecture; the level of concentration is significantly higher in stringently regulated markets for all lines of insurance except OL and MM.

Development of Hypotheses

Insurers' primary rate-making objective is to develop a rate structure that not only passes regulatory scrutiny, but also enables them to compete effectively while earning a reasonable profit on operations (Brown 1993; Webb et al. 1992). The primary input used by insurers in developing rates, and by regulators in evaluating those rates, is the loss reserve estimate. Thus, the rate-making process and the loss-reserving process are often considered to be the same (Peterson 1981).

There are two primary methods for determining rates (Brown 1993; Webb et al. 1992). The loss ratio method determines an adjustment to existing rates based on a comparison of actual and expected loss ratios. The loss ratio is the ratio of total incurred losses (paid losses plus the reserve estimate) to premiums earned. The pure premium method calculates a new rate by dividing expected incurred losses by the number of exposure units, e.g., a car-year in automobile insurance. In either case, expected losses are determined by adjusting historical claims experience to reflect conditions expected to be in effect during the period the rates will be in effect.[6] The two methods are mathematically equivalent and will produce the same rate provided that internally consistent data are used.

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[5] Given its competitive structure, one may question why the P&C industry is extensively regulated. Historically, the justification for not relying on the market was a belief that "destructive competition" among insurers would lead to price instability and firm insolvency (Joskow 1973, 392).

Rates that appear either too high or too low in relation to the level of reserves are likely to attract unwanted regulatory scrutiny, particularly in states with stringent regulation. This focus on loss reserves in the rate-making process creates an incentive to manage reported numbers to obtain the desired rate level. Although overstating loss reserves would enable insurers to justify higher rates, this is not a feasible strategy given the competitive nature of P&C markets. Insurers reporting loss reserves that exceed the economic cost of writing insurance (i.e., the present value of expected future claim payments) will lose business to competitors who report lower reserve estimates and charge lower rates. Consequently, insurers have an incentive to manage loss reserves below the statutorily required nominal value.[7]

Reporting loss reserves below their present value, however, will result in a rate that is not sufficient to provide a reasonable return on the business generated.[8] Therefore, I posit that insurers implicitly discount loss reserves to present value because this level of reserves enables them to justify the competitive rate level to regulators. This study tests the null hypothesis that insurers report loss reserves at the statutorily required nominal value against the following alternative hypothesis:

H1: Property-casualty insurers report loss reserves at the present value of expected future claim payments.

As discussed above, regulators have oversight of insurance rates in all states, although in some states they may not actively exercise this authority. This implies that the incentive to discount loss reserves should be increasing in the stringency of regulatory supervision. However, there are at least two reasons why the implicit discount rate may not be zero for firms operating primarily in relatively lenient jurisdictions. First, even insurers that are able to set rates with little apparent scrutiny may still discount loss reserves because of the potential for subsequent intervention if regulators believe their rates are inadequate in relation to reported costs. Second, few P&C insurers operate only in states with lenient regulation, and thus loss reserves will reflect a weighting of the incentives existing in both stringent and lenient regulatory environments. Nevertheless, I expect insurers operating primarily in stringently regulated states to discount loss reserves to a greater extent than their less regulated counterparts.[9] Stated in alternative form, the second hypothesis is as follows:

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[6] If there is insufficient historical data to use these methods, the insurer must set rates based on the judgment of the underwriter. This approach may be necessary for certain lines of business, such as ocean marine, inland marine, and aviation (Webb et al. 1992).

[7] In a related context, Jarrell (1979) finds that managers of electric utilities used their accounting discretion to report a significantly lower rate base under a regulatory system that allowed free entry and competition among franchises than they did after the creation of exclusive franchises.

[8] Harrington and Danzon (1994) argue that, in the short run, moral hazard may prompt insurers with weak safety incentives (i.e., those with relatively little franchise value) to deliberately understate reported loss reserves to conceal *inadequate* prices from regulators. However, they do not test whether reserves are stated below present value as is implied by their theory. Because insurers at risk of regulatory insolvency have relatively little franchise value, the empirical analysis summarized below considers the effects of financial distress on the incentive to discount reported loss reserves.

> **H2:** Property-casualty insurers operating primarily in relatively stringent regulatory environments discount reported loss reserves to a greater extent than those operating primarily in relatively lenient regulatory environments.

IV. RESEARCH DESIGN

Statutory accounting practices require insurers to record a loss reserve equal to the nominal sum of expected future payments on claims already incurred (NAIC 1994), as follows:

$$RR_{ilt} = \sum_{j=1}^{n} PAY_{ilt+j}, \tag{1}$$

where RR_{ilt} denotes the loss reserve reported by insurer i for line l at the end of calendar year t, and PAY_{ilt+j} denotes insurer i's best estimate of payments to be made for line l over the n years required to settle the outstanding claims.

Because insurers' estimates of expected future claim payments are unobservable, I employ the estimates obtained from an actuarial procedure called the Taylor separation method (Taylor 1977, 1986). The Appendix describes the basic methodology and its empirical estimation. Although there are many actuarial methods available for estimating loss reserves, Cummins (1991) and Cummins and Weiss (1991) argue that the separation method is generally superior to other approaches. This method uses historical claim payments reported in the statutory annual statement to project both the amount and timing of future claim payments. One advantage of using actual paid loss data is that errors in management estimates, whether intentional or unintentional, do not affect the projections. Substituting the estimated claim payments (ESTPAY) into equation (1) yields the following empirical specification of reported loss reserves:

$$RR_{ilt} = \sum_{j=1}^{n} \beta_{jlt} ESTPAY_{ilt+j} \varepsilon_{ilt}. \tag{2}$$

To investigate whether reported reserves contain an implicit discount for the time value of money, I assume that claim payments are made equally throughout the year and impose the functional form of a discounting factor on the coefficient β:

$$RR_{ilt} = \sum_{j=1}^{n} \frac{1}{(1 + r_{lt})^{j-1/2}} ESTPAY_{ilt+j} \varepsilon_{ilt}. \tag{3}$$

The multiplicative error term ε assumes that the regression disturbances are best characterized as a percentage of the dependent variable. Cummins (1991) suggests that the variability of loss reserves is increasing in the level of the reserve, although the increase is less than proportional. A multiplicative error is therefore reasonable, although it is likely to be heteroskedastic. A common variance-stabilizing transformation in this situation is the log transformation (Weisberg 1985):

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[9] Traditionally, anticipated investment income has been excluded from the calculation of P&C insurance rates (Webb et al. 1992). In more recent years, some states have permitted or required its consideration, although others explicitly prohibit its use. However, whether a state allows insurers to consider investment income in the rate-making process does not necessarily coincide with whether it takes a stringent or lenient approach to rate regulation, as defined above. Nevertheless, if some states required rates to include a provision for investment income during my sample period, this is likely to bias against finding evidence consistent with my hypotheses.

$$\ln RR_{ilt} = \ln \left(\sum_{j=1}^{n} \frac{1}{(1 + r_{lt})^{j-1/2}} ESTPAY_{ilt+j} \right) + u_{ilt}, \tag{4}$$

where u is assumed to be $N[0,\sigma^2]$, that is ε is lognormal.

Because the model specified in equation (4) is nonlinear in the interest rate parameter, I use nonlinear least squares for the empirical estimation. Given initial parameter values, this procedure uses an iterative search algorithm to obtain the coefficient estimates that minimize the objective function. I select a starting value of zero for r, representing the discount rate under the null hypothesis that loss reserves are reported at nominal value.[10] Because the residuals in successive cross-sectional levels estimations are not independent, I estimate separate annual regressions for each of the five sample years, 1989–1993.

If insurers implicitly discount reported loss reserves, as predicted by the first hypothesis, then the estimate of r will be greater than zero. Furthermore, if implicit discounting is a response to regulatory intervention in the rate-making process, as suggested by the second hypothesis, then the estimated discount rate will be greater for insurers operating primarily in stringently regulated states. Because insurers effectively borrow from their policyholders when they receive premiums in advance of paying claims, the rate used to discount loss reserves should reflect the fair return on this "loan." Assuming the policies have no default risk, and absent measurement error, the fair return is the risk-free rate of interest (Hill 1979, 180). However, in a more realistic setting in which these assumptions are relaxed, this is unlikely to be the case. Therefore, I limit my predictions about the discount rate coefficient to its sign.

V. DATA AND DESCRIPTIVE STATISTICS

Sample Selection

Of the approximately 20 lines of business for which insurers report loss experience in the statutory annual statement, only ten have sufficiently long settlement periods for discounting to be a potentially significant issue.[11] From these ten lines, I exclude workers' compensation because, as discussed above, insurers typically report loss reserves for this line at present value. In addition, I omit three relatively minor P&C lines (special liability, products liability, and international) that represent, in total, less than 5 percent of industry loss reserves (A. M. Best 1994). The remaining six lines of insurance, identified above as homeowners (HM), private auto (PA), commercial auto (CA), commercial multiple-peril (CM), other liability (OL), and medical malpractice (MM), are the focus of this paper.

The primary data source is the 1989–1993 NAIC Property-Casualty Annual Statement Database which contains the regulatory filings of approximately 2,300 stock and mutual insurance companies domiciled in the United States.[12] For an insurer to be included in the sample for a particular line of business it must report loss reserves that are strictly positive, not explicitly discounted for the time value of money, and primarily the result of business written directly by the insurer. I impose this last restriction because it is the insurer that originally wrote the business that generally determines the loss reserve.[13]

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[10] Untabulated sensitivity analysis indicates that the reported results are robust to a range of reasonable starting values for the interest rate parameter, i.e., $r = 0$ to 0.10, incremented by 0.01.

[11] Average settlement periods for the other lines of insurance are so short that the NAIC only requires insurers to report the two most recent years of loss experience, compared to ten years for the lines examined in this paper.

[12] Data Source: National Association of Insurance Commissioners, by permission. The NAIC does not endorse any analysis or conclusions based upon the use of its data.

The final selection criteria relate to the data requirements of the separation method. First, all data necessary for its estimation, as described in the Appendix, must be available. Second, there must be a reasonably stable and identifiable pattern in the historical claims data because the separation method, like all methods based on past experience, is only reliable if there is a sufficient volume of similar claims in prior years. Untabulated findings confirm that observations with the largest estimation errors (i.e., those where the sum of projected claim payments differs from the reported reserve by more than 50 percent) have either negligible or highly variable claims experience. As a result, I exclude these observations from the final sample.[14]

For each line of insurance, Panel A of Table 2 details the number of observations meeting the above selection criteria. With the exception of MM, there are at least 50 observations available in every sample year. Panel B reports that the sample is drawn from approximately 400 insurers per year, for a total of 1,996 insurer-year observations.

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[13] An insurer is considered to be primarily a direct writer for the year and line of insurance in question if premiums written are greater than premiums assumed. Similarly, insurers participating in a pooling arrangement with affiliated insurers report loss reserves according to the percentage specified in the pooling agreement. If participating insurers are not able to influence the reserving decisions of the affiliate administering the pool, they will not be able to exercise discretion over the loss reserve they report. However, excluding these insurers, which number approximately one-quarter of the final sample, does not change the tenor of the reported results.

[14] This selection criteria eliminates approximately two-thirds of the otherwise acceptable observations for any given year and line of insurance. Reported loss reserves for roughly half of the excluded observations comprise, *in total*, less than 5 percent of the reserves reported by the sample. The remainder of the excluded observations experienced substantial fluctuations in business volume, as indicated by an average standard deviation of premiums during the estimation period that is several times higher than that reported by the sample.

TABLE 2
Sample Observations

	1989	*1990*	*1991*	*1992*	*1993*
Panel A: Line of Insurance					
HM	130	93	90	94	78
PA	50	62	63	70	74
CA	101	96	94	106	88
CM	95	109	99	84	77
OL	177	158	220	242	197
MM	16	17	26	34	33
Panel B: Number of Insurers					
	366	350	419	455	406

See Figure 1 for line-of-insurance definitions.

Descriptive Statistics

Table 3, Panel A indicates that the sample consists of relatively large insurers. Mean (median) total assets are \$471 (\$84) million, compared to \$223 (\$15) million for all other insurers on the NAIC tape (untabulated). However, there is still substantial variation in firm size, primarily due to several particularly large insurers. For example, eliminating observations in the highest decile of total assets reduces the mean (median) to \$131 (\$68) million, with a standard deviation one-tenth of that reported for the full sample. Despite the highly skewed size distribution, untabulated sensitivity analyses indicate that the findings reported below are robust to elimination of these observations. Finally, Panel A reveals that, on average, total reported loss reserves represent slightly more than 50 percent of insurers' liabilities.

Panel B of Table 3 reports descriptive statistics for the regression variables. RR is substantially less than total loss reserves reported in Panel A because I consider only six lines of insurance, and only those observations for which loss reserves can be reasonably estimated for a particular line. Compared to total expected future claim payments, denoted ΣESTPAY, RR is understated by a mean (median) of 9 (13) percent. These estimated reserve errors are generally consistent with findings reported in prior research. For example, Beaver and McNichols (1998) report a mean and median understatement of 12 percent. Similarly, Petroni (1992) reports a mean understatement of 10 percent, although the median insurer in her sample overstates reserves by 2 percent.[15]

I also assess the reasonableness of the estimated claim payments by comparing them to *ex post* realizations. However, I am only able to validate the projections made with 1989–1992 data using actual payments reported in insurers' 1993 annual statements.[16] Pearson correlation coefficients (not tabulated) are approximately 0.90 in all four years for HM, PA, and MM. The correlations for the remaining lines of insurance vary between approximately 0.30 and 0.80. All correlations are significant at the 0.01 level. Moreover, the percentage difference between the actual and estimated payments is insignificant in at least three years for all lines except MM. In contrast, the MM estimates are significantly different from actual payments at the 0.05 level in all but one year. Overall, it appears that the expected future claim payments obtained from estimation of the Taylor separation method are reasonable proxies for actual payments, with the possible exception of MM.

VI. EMPIRICAL RESULTS

Table 4 presents regression summary statistics from the annual estimations of equation (4).[17] With one exception, the discount rate estimates are positive and significant at or below the 0.05 level for every line of insurance except MM. The only regression with an insignificant coefficient estimate is HM in 1992. This finding is likely due to the effects of Hurricane Andrew, which caused a catastrophe loss nearly four times larger than any other in the industry's history (Christensen 1998). Because the claim payments projected using

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[15] One possible explanation for the differences in median reserve errors is that Petroni (1992) uses the reserve reported after five years of development to estimate the error, whereas Beaver and McNichols (1998) use the ten-year developed reserve, and I use an estimate of the total nominal value of loss reserves. Because reserves continue to develop beyond five years, Petroni's (1992) measure may not capture the full extent of reserve understatement.

[16] For example, I compare the projections made with 1989 data to the 1990–1993 realizations, the projections made with 1990 data to the 1991–1993 realizations, and so forth.

[17] Untabulated findings indicate that eliminating influential observations, identified by an absolute studentized residual greater than 3, does not change the tenor of the reported results.

TABLE 3
Descriptive Statistics
(levels in thousands of dollars)

Variable	*Mean*	*Std. Dev.*	*Q1*	*Median*	*Q3*
Panel A: Selected Statutory Annual Statement Variables					
Total assets	470,820	1,693,517	28,024	83,921	260,104
Surplus	137,762	489,577	9,884	27,804	74,860
Net income	7,580	88,741	234	1,846	7,201
Total reported loss reserves	208,507	804,013	7,340	27,260	100,840
Percentage of total liabilities	54	17	44	55	65
Panel B: Regression Variables					
RR	40,424	207,230	936	4,363	17,292
ΣESTPAY	49,391	269,912	878	4,578	20,001
%RESDIFF	9	26	−10	13	30

The sample consists of 1,996 insurer-year observations. The regression variables are defined as follows:

RR = reported reserve;
ΣESTPAY = total expected future claim payments obtained from the separation method; and
%RESDIFF = percentage difference between ΣESTPAY and RR.

TABLE 4
Estimation of the Discount Rate Implicit in Reported Loss Reserves

$$\ln RR_{ilt} = \ln\left(\sum_{j=1}^{n} \frac{1}{(1 + r_{lt})^{j-1/2}} ESTPAY_{ilt+j}\right) + u_{ilt}$$

	HM		*PA*		*CA*		*CM*		*OL*		*MM*		*ALL*[a]	
Year	*n*	$\hat{r}$	*n*	$\hat{r}$	*n*	$\hat{r}$	*n*	$\hat{r}$	*n*	$\hat{r}$	*n*	$\hat{r}$	*n*	$\hat{r}$
1989	130	9.6**	50	15.5**	101	4.0**	95	6.9**	177	4.2**	16	0.3	366	4.7**
1990	93	11.1**	62	12.0**	96	6.8**	109	3.6**	158	4.0**	17	−2.3	350	5.3**
1991	90	11.7**	63	3.7*	94	6.9**	99	3.3*	220	3.5**	26	0.8	419	4.8**
1992	94	3.1	70	9.4**	106	5.3**	84	3.2*	242	1.9**	34	1.1	455	3.5**
1993	78	8.6**	74	9.4**	88	5.3**	77	3.9**	197	2.8**	33	3.2*	406	5.3**

*, ** indicate significance at or below the 0.05, 0.01 level (one-tailed), respectively.

[a] ALL aggregates all lines of insurance by combining the regression variables for each insurer in the sample.

Coefficient estimates are multiplied by 100 for expositional purposes.

See Table 3 for variable definitions.

See Figure 1 for line-of-insurance definitions.

historical data will not capture the effects of such a costly and unexpected event, the estimated discount rate is likely to be biased downward in this case.

In contrast to these results, the estimate of the discount rate implicit in MM loss reserves is significant in only one year. This finding is unexpected because the length of the settlement period for this line of insurance makes it a likely candidate for discounting. One possible explanation for this result is that the small sample size limits the power of the statistical tests. In this regard, note that the discount rate estimated for OL, which has a similar settlement period but a substantially larger number of observations, is significant in all five sample years. It is also possible that measurement error in the estimated claim payments is causing an attenuation bias in the coefficient estimate.

The last column of Table 4 reports the results from estimating the model at the insurer level, i.e., aggregating all lines of insurance for each firm in the sample. As expected, the estimated discount rate is positive and significant in every year. Taken together, the evidence presented thus far supports the hypothesis that insurers report loss reserves at the present value of expected future claim payments. However, these results do not indicate whether discounting is primarily motivated by rate regulation, as predicted by H2.

To test this hypothesis, I calculate the percentage of premiums written in stringently regulated states (%REG) for each line of insurance observation. I consider observations above (below) the median for a given line of insurance and sample year as subject to a high (low) degree of regulation, which I designate HIREG (LOREG). Table 5, Panel A presents descriptive statistics comparing the regulatory environments of the two subsamples.[18] Both mean and median %REG are significantly greater for stringently regulated insurers.

Panel B of Table 5 presents regression summary statistics for the two regulatory environments. Consistent with predictions, the results indicate that stringently regulated insurers discount to a greater extent than leniently regulated insurers. Specifically, the discount rate implicit in the reported loss reserves of the HIREG sample exceeds that of the LOREG sample in every year. The difference between the estimates is significant at the 0.05 (0.10) level in one (two) of the separate annual comparisons. Moreover, the last row of Panel B indicates that the mean difference is significant at the 0.01 level.

The tendency for highly regulated environments to be less competitive, documented in Table 1, may counteract the incentive to discount loss reserves. To examine the sensitivity of the findings to differences in the competitive environment, I partition the sample based on the median percentage of premiums written in competitive states, and compare the reserving behavior of HIREG and LOREG insurers within each competitive environment.[19] The untabulated results of this analysis are consistent with the evidence reported in Table 5; controlling for the level of competition, HIREG insurers discount loss reserves at a rate exceeding that of LOREG insurers, with the mean difference significant at conventional levels.

In summary, the evidence is consistent with insurers implicitly discounting their reserves to present value, particularly when subject to relatively stringent rate regulation. However, the empirical model used to obtain these results imposes the functional form of a present-value calculation on the relation between reported loss reserves and estimated

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[18] Table 5 excludes 56 of the 2,873 line-of-insurance observations for which the data required to calculate %REG are not available.

[19] I consider as uncompetitive states with a Herfindahl Index in the upper quartile of the distribution for the given line of insurance and sample year; all others are considered competitive. The results are similar if I instead use the benchmark of 1,800 to classify observations as uncompetitive.

TABLE 5
Effect of Rate Regulation on the Discount Rate Implicit in Reported Loss Reserves

Panel A: Descriptive Statistics, 1989–1993[a]

%REG	*LOREG*	*HIREG*	*p-value*
Mean	0.11	0.75	0.01
Median	0.04	0.82	0.01
Std. Dev.	0.12	0.24	
n	1,408	1,409	

Panel B: Estimation Results[b]

	LOREG		*HIREG*		
Year	*n*	$\hat{r}$	*n*	$\hat{r}$	*p-value*
1989	198	4.2*	205	5.2*	0.18
1990	191	4.4*	188	6.3*	0.06
1991	226	3.9*	218	5.4*	0.07
1992	239	3.0*	241	3.7*	0.23
1993	215	3.2*	210	5.1*	0.03
Mean[c]		3.7*		5.1*	0.01

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* indicates significance at or below the 0.01 level (one-tailed).

[a] %REG denotes the percentage of premiums written in stringently regulated states, calculated for each insurer and line-of-business observation. See Table 1 for summary information concerning regulatory environments. Observations above (below) the median for a given line of insurance and sample year are classified as HIREG (LOREG). Reported p-values indicate the two-tailed significance level at which the null hypothesis that the means (medians) are equal is rejected.

[b] The estimation equation is: $\ln RR_{lt} = \ln[\Sigma_{j=1}^{n} (1/(1 + r_t)^{j-1/2}) ESTPAY_{lt+j}] + u_{lt}$. The estimation combines the regression variables for each insurer with more than one line of insurance within a particular regulatory environment. Coefficient estimates are multiplied by 100 for expositional purposes. Reported p-values indicate the one-tailed significance level at which the null hypothesis that the coefficient estimates are equal is rejected.

[c] Mean is the mean of the five regression coefficient estimates. The Z-statistic used to test the significance of the coefficient estimates across the separate year regressions is equal to mean $t/(\text{std. dev. } t/\sqrt{T-1})$ (see Bernard 1987).

See Table 3 for variable definitions.

claim payments. Consequently, the results may suggest discounting even if insurers adjust nominal amounts by some percentage that is independent of the timing of expected future claim payments. To distinguish between these competing explanations for the error in reported loss reserves, I estimate the following regression:

$$\%RESDIFF_{ilt} = \alpha + \beta_1 PERIOD_{ilt} + \beta_2 PERIODSQ_{ilt} + \upsilon_{ilt}, \tag{5}$$

where %RESDIFF denotes the percentage difference between total projected nominal claim payments and reported reserves, PERIOD denotes the length of the settlement period (measured as the number of years required for 75 percent of estimated claims to be paid), PERIODSQ is the square of PERIOD, and i, l, and t denote insurer, line of business, and calendar year, respectively.[20] The discounting hypothesis predicts that %RESDIFF is increasing in the settlement period (i.e., $\beta_1 > 0$), but at a decreasing rate (i.e., $\beta_2 < 0$), whereas the alternative hypothesis implies that there is no systematic association between %RESDIFF and the settlement period (i.e., $\beta_1 = 0$ and $\beta_2 = 0$).[21]

Table 6 reports summary statistics from the separate annual estimations of equation (5). Although both regressors are generally insignificant for MM, the results for the remaining lines of insurance, and for all lines combined, are consistent with the predictions of the discounting hypothesis. Specifically, the PERIOD (PERIODSQ) coefficient estimate is positive (negative) in every annual estimation, with the majority of these estimates significant at or below the 0.05 level. Moreover, Z-statistics testing the combined significance of the annual results are significant in the predicted direction for both variables.

VII. SENSITIVITY TESTS

Prior research focuses on two other factors, financial distress and tax status, which may influence management's exercise of discretion over loss reserves. In this section, I examine the impact of these factors on the incentive to report loss reserves at their discounted value.

Financial Distress

Financially distressed insurers may understate loss reserves to meet regulatory solvency requirements. However, this incentive for understating loss reserves is not mutually exclusive of the discounting hypothesis because of the different point of reference. Specifically, prior research (e.g., Petroni 1992) examines the extent to which loss reserves are understated by distressed insurers relative to healthy insurers, whereas I examine the extent to which loss reserves are understated (through discounting) relative to the required nominal value. Thus, both healthy and distressed insurers may discount loss reserves, but with distressed insurers using a higher rate of interest.

To determine whether my findings are attributable to financially distressed insurers understating loss reserves to meet regulatory solvency requirements, I estimate the loss reserve model specified in equation (4) separately for financially healthy and financially distressed insurers. I determine insurers' financial condition based on the eight financial ratios (nine in 1993) used by the NAIC to assess overall financial health, profitability, and liquidity. I classify insurers as financially distressed in years for which they have more than one ratio outside the range considered acceptable by the NAIC, or would have had more than one ratio outside the acceptable range if loss reserves were 5 percent higher than those actually reported. The latter set of observations is included in the distressed subsample because Petroni (1992) reports a significant incremental understatement of loss reserves by insurers "close" to receiving regulatory attention. All other insurer-year observations are classified as financially healthy.

Descriptive statistics reported in Table 7, Panel A, reveal that the mean and median number of unacceptable ratios, designated OUT, are significantly greater for the distressed

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[20] Measuring PERIOD as the number of years required for 100 percent of estimated claims to be paid is problematic because insurers typically have some payment activity throughout the maximum payment period forecast by the separation method (see Appendix). However, the pattern of these payments varies, with some insurers paying the majority relatively soon after occurrence and other insurers paying the majority later in the settlement period. The measure I utilize captures the effective settlement period, while allowing adequate variation in that period to permit meaningful regression analysis.

[21] Because the flexibility inherent in estimating loss reserves generally increases with the length of the tail, insurers may understate long tail lines by a greater percentage than short tail lines. Consequently, aggregating all lines of insurance in the empirical estimation may result in a positive estimate of the PERIOD coefficient under either hypothesis.

TABLE 6
Association Between the Percentage Error in Reported Loss Reserves and the Length of the Settlement Period

$$\%RESDIFF_{ilt} = \alpha + \beta_1 PERIOD_{ilt} + \beta_2 PERIODSQ_{ilt} + \upsilon_{ilt}$$

	Intercept (?)			*PERIOD (+)*					*PERIODSQ (−)*					
	Mean			*Coefficient*		*t-statistic*			*Coefficient*		*t-statistic*			*Mean*
Line	*Coeff.*	*t-stat.*	Z^b	*Mean*	*# > 0*	*Mean*	*# sig.*^{a}	Z^b	*Mean*	*# < 0*	*Mean*	*# sig.*^{a}	Z^b	*Adj.* R^2
HM	−0.17	−1.69	−3.38	0.36	5	2.38	4	4.87	−0.01	5	−1.37	2	−3.79	0.11
PA	−0.43	−2.30	−5.57	0.43	5	3.37	5	7.60	−0.06	5	−3.11	5	−5.74	0.18
CA	−0.44	−2.58	−4.13	0.28	5	3.03	4	4.70	−0.05	5	−2.47	4	−4.70	0.11
CM	−0.38	−2.85	−5.16	0.22	5	2.69	4	5.55	−0.02	5	−1.74	4	−4.09	0.16
OL	−0.39	−2.85	−3.72	0.15	5	2.15	4	4.17	−0.01	5	−1.16	2	−2.78	0.09
MM	−0.74	−1.32	−1.95	0.15	3	0.75	1	1.09	−0.01	3	−0.31	1	−0.43	0.23
ALL	−0.16	−2.38	−4.36	0.13	5	3.55	5	7.60	−0.01	5	−2.33	4	−5.34	0.08

This table presents summary statistics from five annual estimations of the regression equation for each line of insurance, and for all six lines of insurance combined.

[a] Indicates number of estimates that are significant at or below the 0.05 level (one-tailed).

[b] The Z-statistic used to test the significance of the coefficient estimates across the separate year regressions is equal to mean t/(std. dev. $t/\sqrt{T-1}$) (see Bernard 1987).

The regression variables are defined as follows:

%RESDIFF = difference between total projected claim payments and reported reserves, divided by reported reserves;
PERIOD = number of years required for 75 percent of total estimated claims to be paid; and
PERIODSQ = square of PERIOD.

Directional predictions for the independent variables are given in parentheses.

See Figure 1 for line-of-insurance definitions.

TABLE 7
Effect of Financial Distress on the Discount Rate Implicit in Reported Loss Reserves

Panel A: Descriptive Statistics, 1989–1993[a]

OUT	*HEALTHY*	*DISTRESSED*	*p-value*
Mean	0.33	2.76	0.01
Median	0.00	2.00	0.01
Std. Dev.	0.47	1.14	
n	1,566	430	

Panel B: Estimation Results[b]

	HEALTHY		*DISTRESSED*		
Year	*n*	$\hat{r}$	*n*	$\hat{r}$	*p-value*
1989	314	4.3*	52	7.2*	0.05
1990	266	5.5*	84	4.7*	0.35
1991	341	4.3*	78	7.9*	0.01
1992	340	2.7*	115	6.0*	0.01
1993	305	5.8*	101	4.0*	0.09
Mean[c]		4.5*		6.0*	0.14

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* indicates significance at or below the 0.01 level (one-tailed).

[a] OUT denotes the number of financial ratios outside the range considered acceptable by the NAIC. Insurers are classified as DISTRESSED in the years for which they have more than one ratio outside the range considered acceptable by the NAIC, or would have had more than one ratio outside the acceptable range if loss reserves were 5 percent higher than actually reported. All other insurer-year observations are classified as HEALTHY. Reported p-values indicate the two-tailed significance level at which the null hypothesis that the means (medians) are equal is rejected.

[b] The estimation equation is: $\ln RR_{it} = \ln[\Sigma_{j=1}^{n} (1/(1 + r_t)^{j-1/2})\ ESTPAY_{it+j}] + u_{it}$. Coefficient estimates are multiplied by 100 for expositional purposes. Reported p-values indicate the one-tailed significance level at which the null hypothesis that the coefficient estimates are equal is rejected.

[c] Mean is the mean of the five regression coefficient estimates. The Z-statistic used to test the significance of the coefficient estimates across the separate year regressions is equal to mean $t/(\text{std. dev. } t/\sqrt{T - 1})$ (see Bernard 1987).

See Table 3 for variable definitions.

subsample. Regression results, summarized in Panel B of Table 7, indicate that the estimated discount rate is consistently positive and significant regardless of financial condition. However, the discount rate implicit in the reported reserves of distressed insurers exceeds that of healthy insurers in four of the five sample years, with three of the differences significant at the 0.05 level, and the fourth significant at the 0.10 level.

If financially distressed insurers are concentrated in relatively stringent regulatory environments, the inferences drawn earlier regarding the incentive effects of rate regulation may be spurious. Therefore, I reexamine the effect of rate regulation on insurers' reserving behavior excluding distressed insurers from the analysis. These untabulated results yield somewhat stronger evidence of discounting in response to stringent rate regulation than reported in Table 5. Specifically, the estimated discount rate for the highly regulated sample is significantly greater than that of the less regulated sample at the 0.01 level in three years, and for all years combined. Taken together, this evidence indicates that the results documented in the previous section are not attributable to financially distressed insurers, although solvency concerns appear to play an incremental rôle in insurers' reserving decisions.

Tax Status

Prior research has also investigated tax incentives for insurers to manage loss reserves, with mixed findings. Grace (1990) reports that insurers exercised discretion over reported loss reserves to reduce taxable income during 1966–1979, but Petroni (1992) indicates that tax incentives were not a significant factor in insurers' reserving decisions from 1979–1983. Because the Tax Reform Act of 1986 requires insurers to discount reported loss reserves to determine their tax deduction, the tax cost of understating loss reserves (through discounting or other means) is higher during my sample period.[22] As a result, insurers with a high marginal tax rate are likely to have less of an incentive to implicitly discount reserves than other insurers.

To examine whether a high marginal tax rate mitigates the incentive to discount reserves, I estimate equation (4) partitioning by tax status. I assume that insurers not currently paying taxes or receiving a refund of prior year taxes have a low tax rate; all others have a high tax rate. Untabulated results provide some evidence to support the conjecture that a high tax rate reduces the extent to which insurers discount loss reserves. In four of the five sample years the estimated discount rate is lower for the high-tax sample, although the difference is significant at the 0.05 level in only one of these annual comparisons.[23]

VIII. SUMMARY AND CONCLUSIONS

The loss reserves of property-casualty insurance companies pose a fundamental accounting measurement question concerning the treatment of the time value of money. Statutory accounting practices, which emphasize conservative valuation of the balance sheet, require insurers to recognize the liability for claim losses at nominal value. However, because several years may elapse before all claims are paid, this measure disregards the accrual's inherent time-value attribute. While many have debated the appropriate measurement basis for loss reserves (e.g., Webb et al. 1992; Lowe and Philbrick 1986; AICPA 1982), this paper considers whether insurers use their accounting discretion to discount loss reserves to present value in their statutory annual statements.

I find evidence of a positive and significant discount rate implicit in the reported loss reserves of P&C insurers. Moreover, insurers subject to relatively stringent rate regulation discount loss reserves to a greater extent than their less-regulated counterparts. These results support the assertion that insurers discount reported loss reserves in response to regulatory intervention in the rate-making process. Additional analyses indicate that the estimated discount rate varies predictably with other motives to exercise discretion. Consistent with Petroni (1992), financially distressed insurers discount at a higher rate than do healthy insurers, indicating that solvency concerns play an incremental role in insurers' loss-reserving decisions. In contrast, a high marginal tax rate appears to mitigate the incentive to understate loss reserves through discounting.

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[22] If the annual statement explicitly indicates that reported reserves have been discounted, the insurer is allowed to gross up the reported amount to nominal value before determining their tax deduction.

[23] Because of the potentially confounding effects that financial distress may have on this analysis (Penalva 1998), I also estimate the regressions excluding the distressed insurer-year observations identified above. This analysis yields similar results to those reported for the full sample.

An implicit assumption in this paper is that the projected claim payments reflect insurers' expectations. Although I cannot eliminate measurement error as an alternative explanation for the results, the estimated claim payments appear to provide a reasonable proxy of actual payments. In addition, I document evidence of discounting using two different empirical specifications, and show that the discount rate measure varies predictably with other factors that are expected to affect insurers' tendency to discount loss reserves. Moreover, three recent studies (Beaver and McNichols 1998; Penalva 1998; Petroni et al. 1998), each using a different empirical methodology, indicate that their results are consistent with the discounting hypothesis developed and tested in this paper.

APPENDIX

THE TAYLOR SEPARATION METHOD FOR PROJECTING THE AMOUNT AND TIMING OF EXPECTED FUTURE CLAIM PAYMENTS

Methodology

Assume the following matrix of historical paid losses, called the paid-loss development triangle:

Accident	*Development Year (j)*						
Year (i)	0	1	2	. .	k − 2	k − 1	k
0	c_{00}	c_{01}	c_{02}	.	$c_{0,k-2}$	$c_{0,k-1}$	$c_{0,k}$
1	c_{10}	c_{11}	c_{12}	.	$c_{1,k-2}$	$c_{1,k-1}$	
2	c_{20}	c_{21}	c_{22}	.	$c_{2,k-2}$		
.	.	.	.	.			
.	.	.	.				
.	.	.					
k	c_{k0}						

where each c_{ij} represents claim payments made for accident year i in development year j. For example, c_{10} denotes payments made during accident year 1 for losses that occurred during that same year, while c_{11} denotes payments made on accident year 1 losses in the first year after the losses were originally incurred. Note that each south-west to north-east diagonal represents payments made in the same calendar year. The shaded lower triangle represents expected future claim payments on premiums already collected and recognized, i.e., the loss reserve at the end of calendar year k.

The historical claim payments are modeled as the product of three factors, e, ρ, and λ, that depend on the accident year, the development year, and the calendar year, respectively:

$$c_{ij} = e_i \rho_j \lambda_{i-j}, \qquad \text{(A.1)}$$

where e_i measures the insurer's exposure to claim losses in accident year i, ρ_j reflects the proportion of claim payments made in development year j, and λ_{i+j} indexes the claim costs associated with calendar year i + j. Taylor (1977, 227) refers to λ_{i+j} as an "exogeneity index" that captures the "effect of exogenous influences,...not only inflation but *all* influences" on the calendar year cost of settling claims (emphasis in the original).

Normalizing claim payments for the volume of exposure:

$$c_{ij}/e_i = \rho_j \lambda_{i+j} \qquad \text{(A.2)}$$

and substituting into the paid-loss development triangle yields:

Accident	*Development Year (j)*						
Year (i)	0	1	2	.	k − 2	k − 1	k
0	$\rho_0\lambda_0$	$\rho_1\lambda_1$	$\rho_2\lambda_2$	·	$\rho_{k-2}\lambda_{k-2}$	$\rho_{k-1}\lambda_{k-1}$	$\rho_k\lambda_k$
1	$\rho_0\lambda_1$	$\rho_1\lambda_2$	$\rho_2\lambda_3$	·	$\rho_{k-2}\lambda_{k-1}$	$\rho_{k-1}\lambda_k$	
2	$\rho_0\lambda_2$	$\rho_1\lambda_3$	$\rho_2\lambda_4$	·	$\rho_{k-2}\lambda_k$		
·	·	·	·				
·	·	·	·				
·	·	·					
k	$\rho_0\lambda_k$						

Let v_j equal the sum along the jth column and d_h the sum along the hth diagonal:

$$v_j = \rho_j \sum_{l=0}^{k-j} \lambda_{j+l} \tag{A.3}$$

$$d_h = \lambda_h \sum_{l=0}^{h} \rho_l \tag{A.4}$$

It follows that:

$$\rho_j = v_j \Big/ \sum_{l=j}^{k} \lambda_l \tag{A.5}$$

$$\lambda_h = d_h \Big/ \sum_{l=0}^{h} \rho_l = d_h \Big/ 1 - \sum_{l=h+1}^{k} \rho_l \tag{A.6}$$

Assuming that payments made beyond development year k are negligible, i.e., $\Sigma_{j=0}^{k} \rho_j = 1$, allows the system to be solved recursively starting with $\hat{\lambda}_k = d_k$. Cost factors projected for k future calendar years are then used in conjunction with the calculated payout factors to complete the lower half of the paid-loss development triangle. Finally, these normalized values are multiplied by the measure of exposure to obtain the amount and timing of expected future claim payments.

Implementation

For the lines of business examined in this paper, the statutory annual statement requires insurers to present paid-loss development triangles containing cumulative paid losses for the ten most recent accident and development years. After converting to incremental amounts and normalizing by accident year earned premiums, I separate the data into a set of ten payout and cost factors. I estimate the trend in the historical cost factors using a log-linear regression model. This formulation assumes exponential growth in claim costs, which is reasonable given that a major determinant of cost escalation, inflation, is an exponential process (Webb et al. 1992). I then project future cost factors using the estimated average growth rate, and use these factors along with the payout factors and earned premiums data to calculate future expected claim payments according to equation (A.1). Finally, I sum across each of the diagonals in the lower portion of the completed paid-loss development triangle to obtain nine calendar years of expected future claim payments.

Based on the settlement periods plotted in Figure 1, nine years of future claims data appear adequate for the short-tail lines of insurance. However, a substantial portion of OL and MM claims require ten or more years to be settled. This implies that there is some positive proportion ρ of claim payments made subsequent to development period k, i.e., $\sum_{k=k+1}^{\infty} \rho_j = \rho$. Taylor (1986, 65) indicates that in this case "development periods k + 1 and later would need to be dealt with on the basis of some extraneous information." I obtain an estimate of ρ by examining the ratio of losses paid to losses incurred, as in Figure 1. This analysis reveals that, on average, sample firms pay 88 (93) percent of OL (MM) claims within nine years of occurrence, with the remainder paid over an additional nine (five) years assuming the same rate of payment as in the ninth development year. Therefore, I extend the stream of claim payments obtained by the separation method to include these additional cash flows. Additional detail on the estimation of the separation method may be found in Nelson (1997).

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BOOK REVIEWS

Thomas H. Williams, Editor

Editor's Note: Two copies of books for review should be sent to the incoming Book Review Editor, Professor Jane L. Reimers, College of Business, Florida State University, Tallahassee, FL 32306-1042. The policy of *The Accounting Review* is to publish only those reviews solicited by the Book Review Editor. Unsolicited reviews will not be accepted.

ROBERT S. KAPLAN and ROBIN COOPER, *Cost & Effect: Using Integrated Cost Systems to Drive Profitability and Performance* (Boston, MA: Harvard Business School Press, 1998, xi, 357, $29.95 Hb).

This book provides an outstanding synthesis and extension of activity-based costing (ABC) and activity-based management (ABM) concepts. Much of the ABC and ABM literature derives from the work of Kaplan and Cooper, and this book very effectively paints the picture of how cost systems can help to shape business performance.

The first eight chapters form the essential building blocks for the remainder of the book, and they present the material in an intuitive, reader-friendly manner. Readers will emerge from this section with a solid grasp of the concepts, issues, and challenges faced when designing or using cost systems. The topics addressed in these early chapters include cost and performance management systems, standard cost systems, flexible budgeting systems, Kaizen costing, pseudo-profit centers, ABC concepts, and ABM's usage in operational settings.

With the building blocks in place, Chapters 9–11 provide powerful insights into the potential role of ABM in strategic decision making. Among the issues addressed are product mix and pricing, customer relations, supplier relations, and product development. In each of these areas, the authors link the cost system to important strategic issues that organizations face.

The book concludes with discussions of ABC in service industries and extensions of ABC systems in the future. One particularly interesting discussion involves the integration of ABC and enterprise-wide systems.

This book has a number of important strengths. First, the authors make it very clear to the reader that ABC and ABM are not just *accounting* tools—when used properly, they become critical *business* tools. In other words, this is not an accounting book. Rather, it is a business book that explains the enormous potential for accounting systems to help address key questions, such as which products to produce or which customers to serve. I have not seen another publication that so effectively demonstrates the relevance of cost information.

A second key strength of the book is its comprehensive and effective presentation of ABC, ABM, and other cost management topics. All of the key concepts are here, and they are reinforced with helpful, real-world examples. Interested readers, even those with little formal background in accounting, should find this book to be a valuable "one-stop shop" for gaining a solid understanding of ABC and ABM.

A third strength of the book is its forward-looking orientation. The authors describe the progression of cost systems through Stage 1 (cost systems are inadequate even for financial reporting), Stage 2 (cost information comes only from the financial reporting system), Stage 3 (customized, stand-alone systems, such as ABC, provide key cost and performance data), to Stage 4 (integrated cost management and financial reporting, with a focus on feed forward B improving future performance). The authors' forward-looking orientation has two dimensions. They address the future of cost systems (Stage 4), and they also illustrate how the right cost system can improve an individual company's future performance. This future orientation is right on target in today's environment.

As the authors continue their research and writing in this area, I see two key challenges. First, rapid advances in information technology will allow us to do much more than many companies do today—run a stand-alone ABC analysis on a PC (Stage 3). The authors present their view of ABC's integration with enterprise-wide systems (Stage 4), but it will be critical to continue to update this discussion as technological advances go beyond enterprise-wide systems. In a world of e-commerce and pervasive, low-cost computing, what will ABC systems look like? I encourage the authors to continue pushing the envelope (to Stage 5?). The movement from one stage to the next may become more rapid in the future.

The second challenge also relates to technological change, but it reflects the impact of technological advances on business processes and organizational forms. Through advances in technology, many of the processes and activities addressed by ABC and ABM are changing dramatically. In addition, the basic structure of organizations is changing B simply contrast a traditional manufacturer with a ".com" start-up company. How will the ABC and ABM techniques be affected by rapid and continuing changes in processes, activities, and organizational forms? This should be a fruitful area to explore in coming years.

The final issue to address is in what settings this book may be most appropriate. Clearly, the book is an excellent resource for managers or consultants dealing with operational and strategic issues every day. In addition, I see three potential audiences within the university. First, Executive M.B.A. programs would be a natural fit. Many E.M.B.A. programs have a relatively heavy focus on managerial and cost accounting, but from a user perspective. This book is perfectly suited to such an approach. Second, traditional M.B.A. programs can use the book, either in the "core" managerial course, or in an advanced managerial course. Again, the focus would be on business issues first and accounting solutions second. Finally, there may be some undergraduate programs that wish to expose their students to the "business side" of cost accounting at an early stage.

In conclusion, this book provides an outstanding discussion of ABC, ABM, and other cost management issues. It is interesting, insightful, and valuable to a diverse audience. I highly recommend the book to anyone interested in learning more about the power and future of cost systems.

DANA R. HERMANSON
Associate Professor

Kennesaw State University

AHMED RIAHI-BELKAOUI, *Corporate Social Awareness and Financial Outcomes* (Westport, CT: Quorum Books, 1999, xiv, 194, $65 Hb).

This book is devoted to the theme: "Does good corporate social performance lead to financial success?" This is a question that has interested researchers and managers alike for at least the last 25 years, and perhaps now is a good time for someone to summarize what we have learned to date. Unfortunately, the author has not chosen to do that, choosing instead to stitch together his own considerable research in this area, which, while impressive in scope, really cannot capture the progress the field has made in so many areas.

In nine chapters, the author discusses the concept of "corporate social awareness" and a handful of specific issues linking corporate financial performance with societal issues. The author appears to be in the theoretical camp of those who believe that the only responsibility of business is to maximize profits while obeying the law—recognizing that it is sometimes in a firm's best interest to at least appear to have a social conscience. This position is obvious in the curious title of the book, *Corporate Social Awareness*, instead of the normative (and more familiar) corporate social *responsibility* or corporate social *performance*. The author does not address the issue of whether a corporation does or should have social responsibilities, instead claiming, "the financial outcomes...are the best measure of success" (xiii). The lack of discussion about corporate social responsibility and stakeholder theory is surprising in a book that is focused on corporations and their impact on society, but it need not diminish the value of the topics it does address.

The first chapter is devoted to a discussion of corporate social awareness, whereby firms signal their willingness to act as good citizens. The author states that this signaling can be categorized in three ways: (1) adopting socio-economic accounting, (2) ensuring a good corporate reputation, and (3) eliminating fraudulent practices. The author provides a useful theoretical discussion of each of these signaling techniques. The next two chapters provide a theoretical discussion of "social cost" as used in socio-economic accounting (Chapter 2) and an example demonstrating the social cost of air pollution (Chapter 3). Together these chapters are quite useful as a succinct introduction to social costs from an economic theory perspective.

The remaining six chapters of the book each focus on a specific issue of corporate social awareness through presentation of the author's own empirical research. In all but the last, the chapters were adapted from research previously published in refereed academic journals (sometimes with a co-author). Chapter 4 tests financial performance, reputation, and social performance as correlates of CEO compensation. Chapter 5 examines the correlates of corporate reputation for asset management. Chapters 6 through 9 focus on social information disclosure: the financial and environmental determinates of disclosure, and investor reactions to disclosure of socio-economic information.

Each of these chapters/studies was rigorously performed and undoubtedly made a contribution when first published (between 1976 and 1992). Each has extensive reference lists and suggested additional readings. However, during the past ten years there has been a significant amount of research devoted to exploring the relationship between corporate social performance and corporate financial performance. Some of this new research adds to the author's findings reported in this book, some explores completely different issues, and some calls into question the validity of the author's results. An example of the last category would be the author's reliance in two of his studies on *Fortune* magazine's "America's most admired companies" surveys for measures of reputation (as did many researchers in the 1980s and early 1990s). Using this database without some attempt to control for the known financial performance "halo" in the data has been generally discredited. By focusing so tightly on his own research in the field, the author has established his credibility but missed a chance to provide a solid, comprehensive overview of this important field. Because it is primarily a collection of academic articles, this book will not have much appeal to practicing managers. The first three chapters provide a decent theoretical underpinning to social cost, and the extensive references provided in each chapter may be useful to researchers just coming into this area. However, the overall value that this book brings to academic researchers is limited by its lack of an overall theoretical structure and by being a decade out of date.

BRAD BROWN
Associate Professor

University of Virginia

AHMED RIAHI-BELKAOUI, *Significant Current Issues in International Taxation* (Westport, CT: Quorum Books, 1999, xiv, 183, $59.95 Hb).

In his preface to *Significant Current Issues in International Taxation*, the author states that the book will be of interest to practicing accountants, academics, business executives, students, legislators, and others interested in a better understanding of the complex issues of international taxation. Perhaps because the author targeted so many different potential audiences, he has written a book that should be of little interest to anyone. The book is unsuitable as an introductory textbook because it fails to provide a comprehensive, conceptual framework for students or practitioners with no prior knowledge of international tax. Nor does the book focus on international planning strategies that would interest advanced students or experienced practitioners. Throughout the book, the author jumps from one topic to another, with no apparent organization or systematic development. Moreover, the author's approach to the various topics is inconsistent. He approaches some topics from an academic perspective, others from a professional or applied perspective, still others from a political perspective. As a result, the book is a confusing mixture of technical information, business planning advice, and tax policy rhetoric.

In addition to the author's brief preface, the book consists of only five chapters, each followed by the endnotes to the text and a bibliography of selected readings. Chapter 1, "Principles of International Taxation," provides descriptive information on international tax systems and the role of bilateral and multilateral tax treaties. This chapter introduces many relevant, albeit basic concepts, such as the difference between territorial and worldwide jurisdiction and the competing philosophies of tax neutrality in the international context. However, the chapter ignores several key concepts, such as the distinction between inbound and outbound transactions and U.S. and foreign source income. The chapter also contains odd bits of irrelevant information, such as definitions of a poll tax, inheritance tax, and wealth tax, and the complete U.S. corporate income tax rate schedule. The author devotes three pages to the topic of tax havens, which the he defines as "place[s] where foreigners may receive income or own assets without paying higher rates of taxes upon them." As this definition suggests, the author's discussion of this topic is particularly murky and is riddled with editorial comments such as: "Tax havens depend on inconsistencies in U.S. tax laws and, therefore, can be wiped out overnight." All in all, Chapter 1 fails in its objective of providing a set of principles to guide readers in their study of international taxation.

Chapter 2, "U.S. Taxation of Foreign Income," begins with an explanation of the foreign tax credit and the deemed paid credit. The explanation focuses on the computation of these credits and includes simple numeric examples. The author's coverage of the foreign tax credit is similar to the coverage in any textbook or reference service and is, therefore, unremarkable. Chapter 2 continues with a 1½-page discussion of controlled foreign corporations (CFCs) and the Subpart F regime. The author's coverage of this theoretically rich and immensely complex topic is remarkable because of its brevity. The author provides only a cursory definition of CFC and Subpart F income, but fails to include even the most elementary explanation of the operation of Subpart F. Instead, he contents himself with telling his readers, "Compliance with Subpart F requires the filing of Form 5471."

Without a single sentence of transition or preamble, Chapter 2 jumps to a new topic: the unitary business principle and worldwide combined reporting for state income tax purposes. After this detour into multistate taxation, the chapter veers back into a discussion of the federal tax consequences of foreign branch operations and foreign subsidiaries. Finally, Chapter 2 concludes with two irrelevant topics. The author introduces the first topic ("Escaping Tax on Profits in the United States") with this sentence: "The federal tax on profits from the sale of stock, land, or other assets—known as the capital gains tax—can be easily avoided by the United State's richest taxpayers, thanks to an arsenal of Wall Street techniques to delay or entirely avoid taxes on investment gains." The author then expounds on "tax avoidance" devices such as employee stock ownership plans (ESOPs), real estate investment trusts (REITs), like-kind exchanges, and convertible debt instruments, without relating the discussion in any way to international tax planning. The second topic is "Taxes on the Internet," a one-page discussion of the tax policy issues surrounding the growth of electronic commerce. The author concludes this discussion (and this confusing chapter) by stating, "Naturally any taxes on Internet transactions may impede corporations from entering electronic commerce and may shift it to other tax havens."

Chapter 3, "Transfer Pricing," consists mainly of an explanation of the Section 482 transfer price regulations. However, the author does touch briefly on the transfer pricing practices of Canada, Germany, and the United Kingdom, and shares the following enigmatic thought with his readers: "There is no doubt that most countries in the near future will become conscious of the need to monitor the transfer prices of multinational companies. Some may even view that it is in their national interest to do so." Chapter 4, "Tax Incentives for Exporting," focuses on the definitional and operational rules for domestic international sales corporations (DISCs), interest-charge DISCs, and foreign sales corporations (FSCs). The author's treatment of these technical topics is uninspired and adds nothing to the existing academic or professional literature. Chapter 5, "Value-Added Taxation," begins with the historical development of the value-added tax (VAT) and provides numeric examples of the implementation of different types of VATs. The chapter then lists the major advantages and disadvantages attributed to VATs. The chapter closes with the author's analysis of the future of the VAT in the United States. This analysis is peppered with the author's opinions on various tax policy issues. For example, the author deals with supply-side economics by stating, "The notion that the United States could cut tax rates across the board and bring in more money is at best absurd." His conclusion concerning a U.S. VAT is that "It would be, by far, the simplest and most uniform way to raise enormous amounts of revenues."

At only 180 pages, *Significant Current Issues in International Taxation* is a short book on an extremely broad topic. Moreover, the author's own contribution is considerably shorter than 180 pages. Chapter 1 contains 61 pages, but only 23 pages represent the author's text and references. The remainder of the chapter consists of two appendices, which are reprints of papers by other authors. Chapter 2 consists of 17 pages of text and references plus 12 pages of blank tax forms. The appendices to Chapter 3 and 4 contain another 18 pages of blank forms. The inclusion of these appendices detracts from the book and suggests that the author did not have enough original material to justify the book's publication. In conclusion, students and practitioners who are struggling to learn the basics of international taxation can refer to many excellent textbooks that are far superior to this book. And experts in the field will gain nothing from reading this jumbled and often times incoherent work.

SALLY M. JONES
Professor

University of Virginia

REED STOREY AND SYLVIA STOREY, *Financial Accounting Series No. 181-C. Special Report: The Framework of Financial Accounting Concepts and Standards.* (Norwalk, CT: FASB, January 1998, x, 170)

This book provides an introduction to and summary of the Financial Accounting Standards Board 's Conceptual Framework (CF hereafter). This work originally appeared as the first chapter in *The Accountant's Handbook* (Carmichael et al., editors. 1990. John Wiley and Sons). Except for a revised discussion of Accounting Research Bulletins, comprehensive income, verifiability, and income components, the book is the same as the chapter appearing in the eighth edition of the book. However, in light of the potential usefulness of the material in this book for instructional purposes (as discussed below), publication of this material in a "stand-alone" form makes more accessible to students and others who want to learn more about the historical evolution, and elements, of the CF.

The book is comprised of two main sections. In this first third of the book, a summary is provided of the events leading up to the development of the current CF by the FASB. Beginning with the Securities Acts and the development of standards for accounting practice, the book traces the evolution of accounting standard setting by various groups from the Committee on Accounting Procedure (1938–1959) and its Accounting Research Bulletins followed by the Accounting Principles Board (1959–1973). The section concludes with the formation of the FASB, in response to the failure by these prior groups to maintain the support of the constituencies they served.

This historical discussion is a distinctive feature of this book; it is understandable and makes for easy reading. While similar discussions are contained in other works, they are many times brief and focused more on the failings of the individual standard-setting bodies. In contrast, the discussion here is fairly comprehensive and makes the particular and important point that in the absence of an underlying conceptual framework, private sector standard setters have a difficult time developing accounting rules that are acceptable to their respective constituents. Thus, rather than setting a critical tone for the discussion of these prior standard-setting bodies, articulation of the importance of a CF (or lack thereof) sets the stage for the discussion in the second half of the book. This is illustrated well in the discussion at the end of the first section of the challenges faced by the FASB shortly after its inception.

After explaining why a conceptual framework is needed, the specific elements of the CF are discussed in the second part of the book. This section is comprised of an overview and distillation of the specific concept statements, including some of the evolutionary background (e.g., what happened to Statement 3?). This background is important because these features of the CF are not completely apparent to readers of the concept statements as they exist today. Building on the discussion at the conclusion of the first section concerning the accounting for "what you may call its," a strong case is made for developing sound definitions for the elements of financial statements. The primacy of these definitions arguably has been the impetus for the Board's tendency in standards issued since the CF was is place towards an asset-liability view of earnings rather than the revenue-expense matching approach. Thus, this discussion can provide a good backdrop for students' understanding of recent accounting standard setting.

The latter part of the final section provides a distillation and critique of the four primary concept statements on objectives, qualitative characteristics, elements, and recognition and measurement. Compared to relying on the concept statements themselves, this discussion is useful because it focuses on the key elements of each statement and provides analysis of the statements with references to articles that have been published elsewhere. For example, the importance of neutrality (and the accountant as a cartographer) and the folklore status of conservatism receive a balanced and informed treatment. In addition, both supporting and critical views of the recognition statement are provided. This section has a good discussion of comprehensive income, which should provide a good foundation from which to understand recent standards in this area (e.g., SFAS No. 130) and current developments on performance reporting (see, for example, the recent special report by the G4+1 standard setters).

In summary, this book delivers on its objective, which is to provide an introduction to the CF, including discussion of the antecedents for the CF. The book will be most useful to students of accounting, particularly in classes or segments of courses addressing accounting institutions and accounting theory. While the authors caution that this treatment of the CF should not be viewed as a substitute for reading the statements themselves, for many students new to the CF, this book should provide a useful passageway into more in-depth study of the CF and other authoritative literature. The book is organized in a way that it can be split into parts and assigned in smaller pieces. By providing a balanced treatment (with references) of both supporting and critical views of standard setting in general and specifically standard setting based on a CF, the book could replace treatment of these topics based on a direct reading of the statements combined with several articles from different sources. This more efficient and complete treatment will help students gain a better understanding of accounting standard setting and accounting practice.

TERRY WARFIELD
Associate Professor

University of Wisconsin–Madison

BOOKS RECEIVED AUGUST 15, 1999 TO DECEMBER 1, 1999

STEVEN M. BRAGG, *Accounting Best Practices* (New York, NY: John Wiley & Sons, Inc., 1999, vi, 282, Hb $59.95).

LOUIS BRAIOTTA, JR., *The Audit Committee Handbook, Third Edition* (New York, NY: John Wiley & Sons, Inc., 1999, xvii, 446, Pb $60).

PATRICK A. GAUGHAN, *Measuring Commercial Damages* (New York, NY: John Wiley & Sons, Inc., 2000, xii, 403, Hb $105).

ROBERT S. KAPLAN and ROBIN COOPER, *Cost & Effect: Using Integrated Cost Systems to Drive Profitability and Performance* (Boston, MA: Harvard Business School Press, 1998, xi, 357, Hb $29.95).

ALBERT N. LINK and MICHAEL B. BOGER, *The Art and Science of Business Valuation* (Westport, CT: Quorum Books, 1999, xi, 134, Hb $55).

VINCENT M. O'REILLY, BARRY N. WINOGRAD, JAMES S. GERSON, and HENRY R. JAENICKE, *Montgomery's Auditing, Eighth Edition, CPE Version* (New York, NY: John Wiley & Sons, Inc., 1999, xxvi, 694, Hb $85).

THOMAS A. PORCANO, ed., *Advances in Taxation, Volume 11* (Stamford, CT: JAI Press Inc., 1999, xv, 246, Hb $82.50).

GARY JOHN PREVITS, *Research in Accounting Regulation, Vol. 13* (Stamford, CT: JAI Press Inc., 1999, xv, 261, Hb $82.50).

ROBERT RACHLIN, *Total Business Budgeting: A Step-by-Step Guide With Forms, Second Edition* (New York, NY: John Wiley & Sons, Inc., 1999, xiv, 321, Hb $69.95).

RICHARD RAZGAITIS, *Early-Stage Technologies: Valuation and Pricing* (New York, NY: John Wiley & Sons, Inc., 1999, xxiii, 291, Hb $65).

AHMED RIAHI-BELKAOUI, *Earnings Measurement, Determination, Management, and Usefulness* (Westport, CT: Quorum Books, 1999, xvi, 184, Hb $65).

J. TIMOTHY SALE, ed., *Advances in International Accounting, Volume 12* (Stamford, CT: JAI Press Inc., 1999, ix, 274, Hb $82.50).

REED K. STOREY and SYLVIA STOREY, *The Framework of Financial Accounting Concepts and Standards* (Norwalk, CT: Financial Accounting Standards Board, 1998, x, 170, Pb).

Editorial Data

Manuscripts submitted to *The Accounting Review* are assigned two reviewers. The following table contains information about turnaround time for reviewed manuscripts for the twelve-month period ended August 31, 1999. Turnaround time is the number of days between the date of the editor's letter to the author(s) and the date that the manuscript and submission fee were received:

	Number of Manuscripts	Cumulative Number	Cumulative Percent
0 ≤ Days ≤ 30	17	17	6.72
31 ≤ Days ≤ 60	53	70	27.67
61 ≤ Days ≤ 90	125	195	77.08
91 ≤ Days ≤ 120	56	251	99.21
121 ≤ Days	2	253	100.00

The mean review time was 71 days; the median review time was 76 days. A limited number of manuscripts are returned without review and such manuscripts are excluded from the turnaround time statistics reported above.

EDITORIAL POLICY AND STYLE INFORMATION

EDITORIAL POLICY

According to the policies set by the Publications Committee (which were endorsed by the Executive Committee and were published in the *Accounting Education News*, June 1987), *The Accounting Review* "should be viewed as the premier journal for publishing articles reporting the results of accounting research and explaining and illustrating related research methodology. The scope of acceptable articles should embrace any research methodology and any accounting-related subject, as long as the articles meet the standards established for publication in the journal....No special sections should be necessary. The primary, but not exclusive, audience should be—as it is now—academicians, graduate students, and others interested in accounting research."

The primary criterion for publication in *The Accounting Review* is the significance of the contribution an article makes to the literature.

The efficiency and effectiveness of the editorial review process is critically dependent upon the actions of both authors submitting papers and the reviewers. Authors accept the responsibility of preparing research papers at a level suitable for evaluation by independent reviewers. Such preparation, therefore, should include subjecting the manuscript to critique by colleagues and others and revising it accordingly prior to submission. The review process is not to be used as a means of obtaining feedback at early stages of developing the research.

Reviewers and associate editors are responsible for providing critically constructive and prompt evaluations of submitted research papers based on the significance of their contribution and on the rigor of analysis and presentation. Associate editors also make editorial recommendations to the editor.

MANUSCRIPT PREPARATION AND STYLE

The Accounting Review's manuscript preparation guidelines follow (with a sight modification) the B-format of *The Chicago Manual of Style* (14th ed.; University of Chicago Press). Another helpful guide to usage and style is *The Elements of Style*, by William Strunk, Jr., and E. B. White (Macmillan). Spelling follows *Webster's International Dictionary*.

FORMAT

1. All manuscripts should be typed in 12-point font on one side of 8½ × 11" good quality paper and be double spaced, except for indented quotations.
2. Manuscripts should be as concise as the subject and research method permit, generally not to exceed 7,000 words.
3. Margins of at least one inch from top, bottom and sides should facilitate editing and duplication.
4. To assure anonymous review, authors should not identify themselves directly or indirectly in their papers. Single authors should not use the editorial "we."
5. A cover page should show the title of the paper, the author's name, title and affiliation, any acknowledgments, and a footnote indicating whether the author would be willing to share the data (see last paragraph in this statement).

Pagination: All pages, including tables, appendices and references, should be serially numbered. Major sections should be numbered in Roman numerals. Subsections should not be numbered.

Numbers: Spell out numbers from one to ten, except when used in tables and lists, and when used with mathematical, statistical, scientific, or technical units and quantities, such as distances, weights and measures. For example: *three days; 3 kilometers; 30 years*. All other numbers are expressed numerically.

Percentages and Decimal Fractions: In nontechnical copy use the word percent in the text.

Hyphens: Use a hyphen to join unit modifiers or to clarify usage. For example: *a well-presented analysis; re-form*. See *Webster's* for correct usage.

Key Words: The abstract is to be followed by four key words that will assist in indexing the paper.

ABSTRACT/INTRODUCTION

An Abstract of about 100 words should be presented on a separate page immediately preceding the text. The Abstract should concisely inform the reader of the manuscript's topic, its methods, and its findings.

Key Words and the Data Availability statements should follow the Abstract. The text of the paper should start with a section labeled "I. Introduction," which provides more details about the paper's purpose, motivation, methodology, and findings. Both the Abstract and the introduction should be relatively nontechnical, yet clear enough for an informed reader to understand the manuscript's contribution. The manuscript's title, but neither the author's name nor other identification designations, should appear on the Abstract page.

TABLES AND FIGURES

The author should note the following general requirements:

1. Each table and figure (graphic) should appear on a separate page and should be placed at the end of the text. Each should bear an Arabic number and a complete title indicating the exact contents of the table or figure. Tables and figures should define each variable. The titles and definitions should be sufficiently detailed to enable the reader to interpret the tables and figures without reference to the text.
2. A reference to each graphic should be made in the text.
3. The author should indicate by marginal notation where each graphic should be inserted in the text.
4. Graphics should be reasonably interpreted without reference to the text.
5. Source lines and notes should be included as necessary.

Equations: Equations should be numbered in parentheses flush with the right-hand margin.

DOCUMENTATION

Citations: Work cited should use the "author-date system" keyed to a list of works in the reference list (see below). Authors should make an effort to include the relevant page numbers in the cited works.

1. In the text, works are cited as follows: authors' last name and date, without comma, in parentheses: for example, (Jones 1987); with two authors: (Jones and Freeman 1973); with more than two: (Jones et al. 1985); with more than one source cited together (Jones 1987; Freeman 1986); with two or more works by one author: (Jones 1985, 1987).
2. Unless confusion would result, do not use "p." or "pp." before page numbers: for example, (Jones 1987, 115).
3. When the reference list contains more than one work of an author published in the same year, the suffix a, b, etc. follows the date in the text citation: for example, (Jones 1987a) or (Jones 1987a; Freeman 1985b).
4. If an author's name is mentioned in the text, it need not be repeated in the citation; for example, "Jones (1987, 115) says...."
5. Citations to institutional works should use acronyms or short titles where practicable; for example, (AAA ASOBAT 1966); (AICPA Cohen Commission Report 1977). Where brief, the full title of an institutional work might be shown in a citation: for example, (ICAEW *The Corporate Report* 1975).
6. If the manuscript refers to statutes, legal treatises or court cases, citations acceptable in law reviews should be used.

Reference List: Every manuscript must include a list of references containing only those works cited. Each entry should contain all data necessary for unambiguous identification. With the author-date system, use the following format recommended by *The Chicago Manual*:

1. Arrange citations in alphabetical order according to surname of the first author or the name of the institution responsible for the citation.
2. Use author's initials instead of proper names.
3. Date of publication should be placed immediately after author's name.
4. Titles of journals should not be abbreviated.
5. Multiple works by the same author(s) in the same year are distinguished by letters after the date.
6. Inclusive page numbers are treated as recommended in *Chicago Manual* section 8.67.

Sample entries are as follows:

American Accounting Association, Committee on Concepts and Standards for External Financial Reports. 1977. *Statement on Accounting Theory and Theory Acceptance.* Sarasota, FL: AAA.

Demski, J. S., and D. E. M. Sappington. 1989. Hierarchical structure and responsibility accounting. *Journal of Accounting Research* 27 (Spring): 40–58.

Dye, R., B. Balachandran, and R. Magee. 1989. Contingent fees for audit firms. Working paper, Northwestern University, Evanston, IL.

Fabozzi, F., and I. Pollack, eds. 1987. *The Handbook of Fixed Income Securities*. 2nd edition. Homewood, IL: Dow Jones-Irwin.

Kahneman, D., P. Slovic, and A. Tversky, eds. 1982. *Judgment Under Uncertainty: Heuristics and Biases*. Cambridge, U.K.: Cambridge University Press.

Porcano, T. M. 1984a. Distributive justice and tax policy. *The Accounting Review* 59 (October): 619–636.

———. 1984b. The perceived effects of tax policy on corporate investment intentions. *The Journal of the American Taxation Association* 6 (Fall): 7–19.

Shaw, W. H. 1985. Empirical evidence on the market impact of the safe harbor leasing law. Ph.D. dissertation, University of Texas at Austin.

Sherman, T. M., ed. 1984. *Conceptual Framework for Financial Accounting*. Cambridge, MA: Harvard Business School.

Footnotes: Footnotes are not used for documentation. Textual footnotes should be used only for extensions and useful excursions of information that if included in the body of the text might disrupt its continuity. Footnotes should be consecutively numbered throughout the manuscript with superscript Arabic numerals. Footnote text should be doubled-spaced and placed at the end of the article.

SUBMISSION OF MANUSCRIPTS

Authors should note the following guidelines for submitting manuscripts:

1. Manuscripts currently under consideration by another journal or publisher should not be submitted. The author must state that the work is not submitted or published elsewhere.
2. In the case of manuscripts reporting on field surveys or experiments, four copies of the instrument (questionnaire, case, interview plan or the like) should be submitted.
3. Four copies should be submitted together with a check in U.S. funds for $75.00 for members or $100.00 for nonmembers of the AAA made payable to the American Accounting Association. Effective January 1990, the submission fee is nonrefundable.
4. The author should retain a copy of the paper.
5. Revisions must be submitted within 12 months from request, otherwise they will be considered new submissions.

COMMENTS

Comments on articles previously published in *The Accounting Review* will be reviewed (anonymously) by two reviewers in sequence. The first reviewer will be the author of the original article being subjected to critique. If substance permits, a suitably revised comment will be sent to a second reviewer to determine its publishability in *The Accounting Review*. If a comment is accepted for publication, the original author will be invited to reply. All other editorial requirements, as enumerated above, also apply to proposed comments.

POLICY ON REPRODUCTION

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POLICY ON DATA AVAILABILITY

The following policy has been adopted by the Executive Committee in its April 1989 meeting.

"An objective of (*The Accounting Review, Accounting Horizons, Issues in Accounting Education*) is to provide the widest possible dissemination of knowledge based on systematic scholarly inquiries into accounting as a field of professional research, and educational activity. As part of this process, authors are encouraged to make their data available for use by others in extending or replicating results reported in their articles. Authors of articles which report data dependent results should footnote the status of data availability and, when pertinent, this should be accompanied by information on how the data may be obtained."

JANUARY 2000 PLACEMENT ADS

*The deadline for information to be included in the "Placement Information" section is two months prior to the date of publication. The **Review** is published on the first day of January, April, July and October. Placement advertising and replies should be sent to the American Accounting Association, 5717 Bessie Drive, Sarasota, FL 34233-2399, ATTENTION: ADVERTISING DEPT. All replies to box numbers should be on separate sheets to facilitate forwarding.*

101 OTTERBEIN COLLEGE has reopened their search for a tenure-track, Associate/Assistant Professor, Fall 2000. Ph.D. required. ABD candidates will be considered if completion of dissertation is imminent. A commitment to excellent teaching and solid scholarship is essential. Priority will be given to individuals with prior teaching experience, including Managerial Accounting at the M.B.A. level and an ability to teach in a number of Accounting areas. Candidate will teach seven courses per academic year (quarter system) in undergraduate and M.B.A. Accounting. Send application letter, resume, and three (3) current letters of recommendation to Dr. Patricia A. Frick, VP Academic Affairs, Otterbein College, Westerville, OH 43081. Deadline: February 1, 2000 or until position is filled. (Web page: http://www.otterbein.edu.) Women and Minorities are encouraged to apply. Otterbein College is an Equal Opportunity/Affirmative Action Employer.

102 UNIVERSITY OF ARIZONA, Department of Accounting, invites applications for Assistant, Associate, Full Professors, full- and part-time adjunct lecturers of Accounting. Visiting positions may also be available at all ranks for academic year 2000–2001. Applicants for Assistant rank should possess a Ph.D. or be nearing completion. Advanced rank applicants must possess an earned doctorate and an established record of recent and continuing research and quality teaching. All tenure-track applicants must be committed to a continuing research program. Visitors/lecturers with a Ph.D., pertinent experience, and a CPA certificate will be given preference. Review of applications will begin November 2, 1999. This announcement will remain open until the positions are filled. Send *curriculum vitae* and a letter indicating position of interest to Professor Dan S. Dhaliwal, Head, Department of Accounting, McClelland Hall 301, University of Arizona, PO Box 210108, Tucson, AZ 85721-0108. The University of Arizona is an EEO/AA Employer; M/W/D/V.

103 NATIONAL DONG-HWA UNIVERSITY's Department of Accounting invites applications for two positions in accounting effective August 1, 2000. The rank is open. Applicants should possess a Ph.D. in Accounting or expect completion of Ph.D. program by the end of the 1999–2000 academic year. They should also specialize in at least one of the following two fields: Financial Accounting and Management Accounting, and one of the following three fields: Auditing, Tax Law and Accounting, and Accounting Information Systems. The positions will remain open until filled. Please send letter of application, resume, three letters of recommendation, examples of recent scholarly work, and a copy of transcript for Ph.D. program to Dr. Young Hang Chang, Department of Accounting, National Dong-Hwa University, Hualien, Taiwan. Telephone: +866-3-8662500, Ext. 1771 or 1772; Fax: +866-3-8663367.

104 UNIVERSITY OF NEBRASKA AT OMAHA invites applications for Assistant Professor of Accounting for Fall 2000. The Department of Accounting consists of 15 FTE faculty and offers both undergraduate and graduate programs in Accounting. The AACSB-accredited College of Business Administration (CBA) has approximately 2,000 undergraduate majors and 400 graduate students. Candidates should have a commitment to teaching excellence and demonstrate the ability to publish high-quality research. An earned doctorate (ABD considered) is required. Salary is competitive and commensurate with qualifications. Send letter of application, resume, dissertation proposal or research paper, and two letters of recommendation to Professor Vivek Mande, Chair, Faculty Search Committee, Department of Accounting, CBA 408, University of Nebraska at Omaha, Omaha, NE 68182.

105 CATHOLIC UNIVERSITY OF AMERICA seeks a tenure-track Assistant Professor beginning Fall 2000. Primary field of specialization in Financial/Managerial Accounting is a must. Candidates must have Ph.D. before date of appointment and demonstrate strong research and teaching potential. Teaching experience highly desirable. Normal teaching load is five or six courses per year with two or three preparations, depending on departmental needs. Student advising and participation on departmental/school/university committees also expected. Catholic University of America was founded in the name of the Catholic Church as a national center of research and scholarship. Regardless of their religious affiliation, members of the faculty are expected to respect and support the university's mission. Applicants should send *curriculum vitae*, writing sample, teaching evaluations (if any), and three letters of recommendation to Ernest M. Zampelli, Chair, Department of Business and Economics, Catholic University of America, Cardinal Station, Washington, D.C. 20064. Email: zampelli@cua.edu. Applications accepted until position is filled. Catholic University of America is an Equal Opportunity Employer.

106 UNIVERSITY OF MIAMI invites applications for the Metzger Scholar in Accounting position. Candidates should possess a doctoral degree in Accounting. Additionally, the successful candidate will have a record commensurate with the rank of Associate Professor or Full Professor. The holder of the Metzger Scholar of Accounting is expected to actively participate in the Department of Accounting's programs including: (1) active teaching at both the undergraduate and graduate level—the School of Business Administration maintains a very active and successful executive M.B.A. program, and the applicant is expected to participate in this program; (2) the candidate is expected to contribute to the research mission of the Department—especially by working with other members of the faculty on collaborative projects; (3) the candidate is expected to actively participate in the activities of the south Florida professional and business community. Please submit a letter of application, *curriculum vitae,* and three letters of recommendation to Paul Munter, Chairman, Department of Accounting, 317 Jenkins Building, School of Business Administration, University of Miami, Coral Gables, FL 33146-6531.

107 OHIO STATE UNIVERSITY seeks to fill the position of Chairperson of the Department of Accounting and Management Information Systems in the Fisher College of Business. All applicants must possess an earned doctorate. The applicant is expected to have a record of scholarly achievements commensurate with the rank of Full Professor of Accounting and Management Information Systems, at Ohio State University. Professional certification and previous administrative experience are highly desirable. This Department offers programs leading to the attainment of a B.S.B.A. with majors in Accounting and Management Information Systems, a Master's in Accounting and Management Information Systems, and a Ph.D. in Accounting and Management Information Systems. Desired starting date is prior to Autumn Quarter, 2000. Salary and benefits are competitive. Send resume to Professor Daniel L. Jensen, Fisher College of Business, 2100 Neil Avenue, Columbus, OH 43210. To be assured of full consideration nominations should be received by January 15, 2000. Ohio State University is an Equal Opportunity/Affirmative Action Employer.

108 STATE UNIVERSITY OF NEW YORK AT STONY BROOK, W. Averell Harriman School for Management and Policy, seeks applications for tenure-track positions in Behavioral or Financial Accounting. The Harriman School offers an undergraduate degree in business, and full-time and executive Master's degree programs in Management with a focus on Technology. Candidates must have a Ph.D. in a related field, demonstrated excellence in research, evidence of teaching effectiveness, and relevance to technology management. While ranks are open, Assistant Professor appointments are most likely. Send *curriculum vitae,* selected research papers, and three letters of recommendation to Search Committee, 306 Harriman Hall, University at Stony Brook, Stony Brook, NY 11794-3775. Candidates from underrepresented groups are urged to apply. USB is an Equal Opportunity/Affirmative Action Employer.

109 UNIVERSITY OF WESTERN ONTARIO, Richard Ivey School of Business, seeks candidates for a probationary tenure-track position, tenured appointment or limited-term position in the area of Management Accounting and Control. The position is available to begin in September 2000. The successful candidate will demonstrate a strong commitment to the practice of management in both research and teaching. This position is subject to budget approval. In accordance with Canadian immigration requirements, priority will be given to Canadian citizens and permanent residents of Canada. Contact Professor Claude Lanfranconi by telephone: (519) 661-3225 or by email: clanfran@ivey.uwo.ca. The Richard Ivey School of Business, an internationally recognized business school, and the University of Western Ontario are committed to employment equity, welcome diversity in the workplace, and encourage applications from all qualified individuals including women, members of visible minorities, aboriginal persons, and persons with disabilities.

110 UNIVERSITY OF SOUTHERN CALIFORNIA, Leventhal School of Accounting, is seeking candidates to fill tenure-track positions at the Assistant, Associate, or Full Professor levels for Fall 2000. Candidates for Assistant Professor should have a doctorate in hand or be near completion of the dissertation. All candidates should have a strong commitment to scholarly research and excellent teaching ability. Please contact Kenneth A. Merchant, Dean, Leventhal School of Accounting, University of Southern California, Los Angeles, CA 90089-1421. Applications from women and minority candidates are encouraged. The University of Southern California is an Equal Opportunity/Affirmative Action Employer.

111 UNIVERSITY OF NORTHERN COLORADO, Kenneth W. Monfort College of Business, invites applications for an Assistant or Associate Professor of Accounting: Position #20955. The desired areas of specialization are in the Managerial/Cost and AIS fields, but other specializations will be considered. The position is for August 2000 or sooner if possible. The search begins immediately and will continue until the position is filled. Candidates must have completed all requirements for a Ph.D. or Doctorate degree in Accounting from a regionally accredited institution by the position starting date. Candidates must be committed to scholarly and professional research, effective teaching, and university and community service. Candidates should apply to Professor John Elsea, Kenneth W. Monfort College of Business, University of Northern Colorado, Greeley, CO 80639. UNC is an Affirmative Action/Equal Opportunity Employer.

112 MIDDLE TENNESSEE STATE UNIVERSITY, Department of Accounting, invites applications for two tenure-track faculty positions at the Assistant/Associate Professor rank, beginning August 2000. Candidates should possess an earned doctorate (or be near completion of all degree requirements) in Accounting or a related area. One position (#110150) requires a primary interest in teaching accounting systems; teaching interest for the other position (#110170) is open. Applicants should have a strong commitment to excellence in teaching, research and publication, and service. The Department of Accounting offers an undergraduate degree in Accounting, a Master's degree in Accounting/Information Systems, and supports the accounting concentration in the M.B.A. program. Review of applications will begin November 1, and will continue until positions are filled. Submit application letter, resume, transcripts, and three letters of reference to Dr. Paula B. Thomas, Search Committee Chair, MTSU Box 50, Murfreesboro, TN 37132. EO/AA/ADA.

113 SOUTHERN CONNECTICUT STATE UNIVERSITY invites applications for two (2) tenure-track positions at all levels beginning Fall 2000. A terminal degree, or significant progress toward completing one, is required. Practical experience, publication activity commensurate with the level applied for, and professional certification(s) are desirable. Salary and rank depend upon qualifications and prior experience. Candidates should submit their resumes by January 15, 2000 to Dr. Carey C. Curtis, Chair of the Search Committee, Accounting Department, SCSU, 501 Crescent Street, New Haven, CT 06515. SCSU is an Affirmative Action /Equal Opportunity Employer and strongly encourages minorities and women to apply.

114 RICE UNIVERSITY, Jones Graduate School of Management, has a tenure-track opening in the area of Accounting at the Assistant Professor level, beginning Fall 2000. Candidates should hold a Ph.D. or be nearing completion of their degree, and demonstrate evidence of quality teaching and strong research potential in Financial or Managerial Accounting. Candidates with teaching interests in Managerial Accounting are preferred. Rice offers full-time M.B.A. and weekend executive M.B.A. programs. Teaching in both programs is expected. The normal teaching commitment for entry-level faculty is two semester-course equivalents per year for the first three years and three per year thereafter. Faculty are provided the flexibility to structure their teaching during the year to enhance the quality of both their teaching and research activities. Applicants should send a *curriculum vitae*, copies of publications and/or working papers, or dissertation proposal to Associate Dean Robert A. Westbrook, Jesse H. Jones Graduate School of Management—MS531, Rice University, PO Box 1892, Houston, Texas 77251-1892. Rice University is an Equal Opportunity/Affirmative Action Employer.

115 MARSHALL UNIVERSITY invites applications for Division Head and Associate/Assistant Professor positions. The Lewis College of Business is seeking candidates for Division Head of Accounting/Legal Environment who have a doctoral degree in field, a high-quality research record, and demonstrated excellence in teaching. Preference will be given to those with administrative experience. Candidates with outstanding records may be considered for Full Professor. Candidates for faculty positions must have a doctoral degree in field, a high-quality research record, and demonstrated excellence in teaching. Preference will be given to those with full-time teaching experience and CPA/CMA certification. Special teaching interest in Tax, Systems, or Financial/Governmental. The LCOB, accredited by AACSB, offers undergraduate and graduate programs in Huntington, WV, and graduate programs in Charleston, WV. Salary commensurate with qualifications and is AACSB-competitive. Positions open until filled. Send resume, letters of recommendation, and transcripts to Gael Setliff, Dean's Office, Lewis College of Business, Marshall University, Huntington, WV 25755-2300. AA/EOE.

116 THE GEORGE WASHINGTON UNIVERSITY, School of Business and Public Management, Department of Accountancy, invites applications for two full-time faculty positions at the Assistant/Associate Professor level and a visiting position. The anticipated starting date is Fall 2000. A relevant doctoral degree is required. Strong ABD candidates will be considered only if degree requirements can be completed prior to the appointment date. Potential or demonstrated commitment to teaching excellence and scholarly research is expected. Please send a letter of application, a current resume, faculty recommendation letters, and evidence of research to Professor Debra R. Sheldon, Chair, Department of Accountancy, School of Business and Public Management, The George Washington University, Washington, D.C. 20052. The George Washington University is an Equal Opportunity/Affirmative Action Employer.

117 UNIVERSITY OF ROCHESTER, William E. Simon Graduate School of Business Administration, seeks to hire Professors of Accounting at all levels (Assistant, Associate, Full). Applicants must have a Ph.D. (or be pursuing the degree) in Accounting or a related field, and exhibit outstanding research capabilities. Resumes should be sent to Professor Jerold L. Zimmerman, William E. Simon Graduate School of Business Administration, University of Rochester, Box 270100, Rochester, NY 14627-0100. The University of Rochester is an Affirmative Action/Equal Opportunity Employer.

118 SACRED HEART UNIVERSITY, College of Business, invites applications for a tenure-track Assistant Professor position in Accounting starting Fall 2000. Applicants with a Ph.D. or D.B.A. in Accounting and relevant professional certification(s) (CPA, CMA, CIA) are preferred. However, ABD is also considered. Areas of teaching interest should include Financial Accounting and Intermediate Accounting. Candidates with excellent teaching records, relevant business experience, and a demonstrated capability to produce scholarly work publishable in refereed journals are encouraged to apply. Applicants should submit a letter of interest, *curriculum vitae*, student evaluations, samples of publications or research working papers, names, addresses, and phone numbers of three referees to Dr. Benoît Boyer, Dean, College of Business, Sacred Heart University, 5151 Park Avenue, Fairfield, CT 06432. Deadline: February 28, 2000.

119 UNIVERSITY OF ILLINOIS AT CHICAGO, Department of Accounting, invites applications for positions of Assistant or Associate Professor of Accounting. Applicants at the Assistant level should possess a Ph.D. or have an anticipated completion date of August 2000. All applicants must exhibit a capacity to produce quality research and a commitment to teaching excellence. Responsibilities include research and undergraduate/graduate teaching generally six hours (two courses) per semester. Closing date for applications is February 15, 2000, although that date may be extended. Starting date is August 2000. UIC is one of 70 Research I universities in the country. Further information about the department can be seen at http://accounting-net.actg.uic.edu/. Send *curriculum vitae* and three reference letters to Ram T. S. Ramakrishnan, Department of Accounting (m/c 006), College of Business Administration, University of Illinois at Chicago, 601 S. Morgan, Chicago, IL 60607; Email: rramakri@uic.edu. The University of Illinois is an Affirmative Action/Equal Opportunity Employer.

120 UNIVERSITY OF NOTRE DAME, Department of Accountancy, invites applications for position openings at the Assistant and Associate Professor levels. All research areas will be considered. Applicants for Assistant Professor positions should expect to complete doctoral degree requirements before the start of the contract period. All candidates should have a strong commitment to scholarly research and excellence in teaching. Salary is very competitive and research support is excellent. Please send *curriculum vitae* and an example of scholarly work to Professor Tom Schaefer, Chair, Department of Accountancy, Room 102D, College of Business Administration, University of Notre Dame, Notre Dame, IN 46556-5646. The University of Notre Dame is an Equal Opportunity/Affirmative Action Employer.

121 UNIVERSITY OF KENTUCKY is now accepting nominations and applications for the Carol Martin Gatton Chair in Behavioral Accounting. The School seeks a highly productive scholar with an established academic reputation and major publications to fill a position at the rank of Full Professor. The candidate should have demonstrated a commitment to teaching, research, and service and should expect to be involved in both graduate and undergraduate education. This individual will play an important role in helping the School of Accountancy increase its research exposure and national positioning as a major research university. The search will continue until the position is filled. Contact: Dr. Michael Tearney, Chair, Gatton Behavioral Accounting Chair Recruiting Committee, School of Accountancy, University of Kentucky, Lexington, KY 40506-0034; Telephone: (606) 257-3592; Email: tearney@ukcc.uky.edu. The University of Kentucky is an Equal Opportunity Employer.

122 UNIVERSITY OF KENTUCKY invites applications for a tenure-track position at the rank of Assistant Professor or Associate Professor beginning August 2000. Applicants must have a Ph.D. and a strong commitment to both graduate and undergraduate education. Candidates with research and teaching interests in Financial Accounting are preferred. Assistant Professors with a research record are strongly encouraged to apply. Applications will be considered until the position is filled. Contact: Dr. Michael Tearney, Chair, Search Committee, School of Accountancy, University of Kentucky, Lexington, KY 40506-0034; Telephone: (606) 257-3592; Email: tearney@ukcc.uky.edu. The University of Kentucky is an Equal Opportunity Employer.

123 WRIGHT STATE UNIVERSITY is accepting applications for a tenure-track position at the rank of Assistant Professor in the Department of Accountancy. Candidates should be committed to teaching effectiveness and research. Applicants must have a doctoral degree or be finished by June 2001, with an Accounting Systems concentration. Professional certification is preferred and relevant business experience is required. The College of Business and Administration is accredited by AACSB and the Department of Accountancy is also separately accredited by AACSB. Screening will begin December 1, 1999, with the position available September 1, 2000. Later start dates will be considered. Please send a letter of application and *curriculum vitae* to: Dr. Kennard S. Brackney, Acting Chair, Department of Accountancy, Wright State University, 3640 Colonel Glenn Highway, Dayton, OH 45435-0001. Wright State is an EO/AA Employer.

124 WRIGHT STATE UNIVERSITY is accepting applications for a tenure-track position at the rank of Assistant Professor in the Department of Accountancy. Candidates should be committed to teaching effectiveness and research. Applicants must have a doctoral degree or be finished by June 2001, with an Accounting concentration. Professional certification is preferred and relevant business experience is required. The College of Business and Administration is accredited by AACSB and the Department of Accountancy is also separately accredited by AACSB. Screening will begin October 1, 1999, with the position available September 1, 2000. Later start dates will be considered. Please send a letter of application and *curriculum vitae* to Dr. Kennard S. Brackney, Acting Chair, Department of Accountancy, Wright State University, 3640 Colonel Glenn Highway, Dayton, OH 45435-0001. Wright State is an EO/AA Employer.

125 UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE invites applications for a tenure-track faculty position for Assistant Professor of Accounting starting Fall 2000. The position requires a completed Ph.D. or D.B.A. with balanced teaching and research interests. Our current needs are for a candidate whose primary and secondary areas include Managerial and Systems. However, strong candidates with other interest areas are encouraged to apply. The University's enrollment is approximately 17,000. The Belk College of Business Administration enrolls 2,700 undergraduate and 500 graduate students in its M.B.A. and its Master of Accountancy Programs. All College programs are accredited by the AACSB. Applicants should send a current *curriculum vitae* to Dr. Howard Godfrey, Chair, Department of Accounting, University of North Carolina at Charlotte, 9201 University City Boulevard, Charlotte, NC 28223-0001; Email: Accounting@email.uncc.edu; Web site: http://www.uncc.edu/accounting/. The University of North Carolina at Charlotte is an Affirmative Action/Equal Opportunity Employer. Women, minorities, and individuals with a disability are strongly encouraged to apply.

126 HARVARD UNIVERSITY, John F. Kennedy School of Government, invites applicants for the position of Assistant Professor beginning September 2000 in the field of Budgeting and Accounting. We are particularly, but not exclusively, interested in candidates with expertise in public and/or nonprofit sector Budgeting and Accounting. Qualifications for appointment include a distinguished Ph.D. record, evidence of a commitment to research, strong teaching skills, and a demonstrated interest in public policy issues. Applicants should send a *curriculum vitae*, transcript, letters of recommendation, and papers and publications to Professor James H. Stock, John F. Kennedy School of Government, Harvard University, Cambridge, MA 02138. Harvard University is an Affirmative Action/Equal Opportunity Employer.

127 UNIVERSITY OF NORTH CAROLINA AT ASHEVILLE (UNCA) seeks tenure-track Assistant/Associate Professor of Accounting beginning August 2000. Candidate should possess a doctorate or be an ABD candidate in Accounting or related field. Excellent undergraduate teaching skills and ability to do research in the discipline or in pedagogy are expected. UNCA seeks collegial faculty with the ability to work in an interdisciplinary, liberal arts environment. Application review begins January 10, 2000. Send application letter, *curriculum vitae*, statement of teaching philosophy, three references with contact information, and evidence of teaching abilities to Professor Martha Marshall, Department of Management and Accountancy, CPO# 1850, University of North Carolina at Asheville, One University Heights, Asheville, North Carolina 28804-8507; Email: marshall@unca.edu; Fax: (828) 251-6857; Web site: http://www.unca.edu/mgmtacct. AA/EOE.

128 TEXAS A&M UNIVERSITY–CORPUS CHRISTI is seeking applications and nominations for the Ennis S. and Virginia C. Joslin Endowed Chair in Accounting. Professional certification (CPA, CIA, CMA) is desirable. The successful candidate must have a well-established record of peer-reviewed journal articles, teaching, and professional contributions in the field of Accounting. Position requires some teaching at the graduate and undergraduate levels, working with students, faculty, and business leaders to further advance the reputation of the College. The undergraduate and graduate business programs are AACSB-accredited. Review of applications will continue until the position is filled. Correspondence should be sent to Steven Hall, Chair, Department of Accounting and Business Law, College of Business, Texas A&M University–Corpus Christi, 6300 Ocean Drive, Corpus Christi, Texas 78412. Texas A&M University–Corpus Christi is an Equal Opportunity Employer with a commitment to diversity.

129 JACKSONVILLE STATE UNIVERSITY invites applications for an Eminent Scholar. The successful candidate will be an experienced scholar with a demonstrated commitment to teaching excellence. The candidate must possess an ability to work with College faculty in promotion of scholarly activity and also promote the University by interacting with the broader community. An earned doctorate in Accounting and a very significant publishing record in quality, refereed journals are required. Applications will be reviewed until the position is filled or the search is terminated. The business programs at Jacksonville State University are accredited by AACSB. Send application (available on our web site: http://www.jsu.edu), resume, and three references to Director, Personnel Services, Jacksonville State University, 329 Bibb Graves Hall, 700 Pelham Road North, Jacksonville, Alabama 36265-1602. Jacksonville State University is an Affirmative Action/Equal Opportunity Employer.

130 MORGAN STATE UNIVERSITY, Earl G. Graves School of Business and Management, invites applications for tenure-track Assistant/Associate Professor of Accounting. Candidates for Assistant Professor should have Ph.D. or D.B.A. in Accounting, or be near completion of dissertation and have demonstrated potential for quality teaching and research. Candidates for Associate Professor should have a significant record of publications. Specialties desired are Managerial Accounting, Financial Accounting, and Taxation. Salary and fringe benefits are AACSB-competitive. Anticipated starting date is in August 2000. The Graves School offers a B.S. degree in Accounting and an M.B.A. degree with concentrations in Accounting and Taxation. The Graves School is accredited by AACSB at both undergraduate and graduate levels. Candidates should send letter of interest, *curriculum vitae*, and name, address, and telephone number of three references to Dr. Sharon Gary Finney, Chairperson, Department of Accounting and Finance, Graves School of Business and Management, Morgan State University, Baltimore, MD 21251. Morgan State University is an Affirmative Action/Equal Opportunity Employer.

131 SAN DIEGO STATE UNIVERSITY (SDSU), School of Accountancy, invites applications for an Assistant Professor position in Audit/Assurance Services. Applicants should have, by August 2000, a Ph.D. or D.B.A. in Accounting with a primary emphasis in Auditing/Assurance services. Candidates with a Ph.D. in education, or equivalent, with training or experience in Auditing/Assurance Services will be considered. Training and/or interest in technological applications in Auditing are desired. The position is available August 2000. Applicant consideration begins on 12/10/99. Compensation is approximately $65K, dependent upon qualifications, and is subject to final budget. If interested, email or send a letter stating an interest, *curriculum vitae*, three recommendation letters, and examples of teaching and scholarship to Andrew H. Barnett, School of Accountancy, San Diego State University, San Diego, CA 92182-8221; Email: andrew.barnett@sdsu.edu. See http://soa.sdsu.edu/ for position details. SDSU is an Equal Opportunity Employer.

132 LITHUANIA CHRISTIAN COLLEGE in Klaipeda, Lithuania, seeks volunteer faculty for one or more years to teach beginning Financial and Managerial Accounting, in English, as part of a volunteer North American faculty community. Collegiate teaching experience is preferred; commitment to service in this Baltic country required. Academic year begins mid-August. Visit our web site at http://www.lccbc.org/. Reply to Academic Dean, David Shenk at dean@lcc.lt or send a letter and *curriculum vitae* to our North American office, 204-1520 McCallum Road, Abbotsford, British Columbia, V2S 8A3 CANADA.

133 WEST CHESTER UNIVERSITY OF PENNSYLVANIA, Department of Accounting, is searching for a tenure-track faculty member. Ph.D. in Accounting preferred; ABD in Accounting who anticipates completion of Ph.D. program in the near future may be considered. Candidates with professional certification preferred. Two years of university Accounting teaching experience preferred. Rank of Assistant or Associate Professor, depending on qualifications. Finalists must successfully complete an interview. Applications accepted until 2/1/00. Send letter of application and *curriculum vitae* to Professor Carl Smith, CPA, Search Committee, Department of Accounting, West Chester University, West Chester, PA 19383. AA/EOE. Women and minorities are encouraged to apply.

134 UNIVERSITY OF MICHIGAN, Business School, has one entry-level tenure-track position available in Accounting starting in the 1999–2000 academic year. Applications should include a research paper based on the candidate's dissertation, any other published or unpublished research, evidence of teaching experience (if any), and a *curriculum vitae* that includes three references. Applicants should have primary research and teaching interests in Financial Accounting. Applications should be sent to Professor Douglas J. Skinner, Business School, University of Michigan, 701 Tappan Street, Ann Arbor, MI 48109-1234. The University of Michigan offers competitive salary and fringe benefits and is an Affirmative Action/Non-Discriminatory Employer.

135 UNIVERSITY OF CALIFORNIA AT BERKELEY, Haas School of Business, invites applications for Executive Director of the Center for Financial Reporting and Management (CFRM) (Academic Coordinator/Lecturer). Reporting to Accounting faculty chair, Executive Director provides leadership for CFRM. Responsibilities include (1) developing and supervising center activities, (2) interacting with outside constituents, (3) supervising the center manager, (4) fund-raising, and (5) teaching 50–67 percent of the time. Approximate start date is July 1, 2000. Qualifications include ability to work effectively with diverse constituencies, evidence of superior teaching skills, and excellent communications skills. Fund-raising experience and administrative experience within an academic environment preferred; prior experience within a Bay Area accounting, consulting, or investment banking firm desirable. M.B.A. degree and/or CPA certification preferred. Salary range for Academic Coordinator: $61,836–$100,524; salary range for Lecturer: $53,184–$86,112. To apply, send cover letter, resume, and names and addresses of three references to Professor Brett Trueman, Chair, Accounting Group, Haas School of Business, University of California at Berkeley, Berkeley, CA 94720. The application deadline is March 1, 2000. The University of California at Berkeley is an Equal Opportunity/Affirmative Action Employer.

136 IOWA STATE UNIVERSTY, Department of Accounting, invites applications for a tenure-track position at the Assistant or Associate rank specializing in Tax. Appointment begins August 16, 2000. An Assistant Professor candidate must exhibit a capacity for quality research and teaching. A candidate for Associate must be an established scholar and teacher. Other requirements include a Ph.D. in Accounting or a related field (or an advanced stage ABD for an assistant). Send *curriculum vitae*, a statement of teaching and research interests, and names of three references to David B. Smith, Department of Accounting, Iowa State University, 396 Carver Hall, Ames, IA 50011-2063 or Email: smithdb@iastate.edu. Iowa State is an Affirmative Action/Equal Opportunity Employer.

137 COLLEGE OF NEW JERSEY invites applications for the position of Dean, School of Business. Reporting to the Provost and Vice President for Academic Affairs, the Dean provides academic and administrative leadership for the School of Business. The Dean will articulate the College's vision, and extend its reach by attracting a more diverse cohort of highly able students and faculty. The School of Business enrolls over 1,000 students, with 35 F/T faculty, offering undergraduate programs (AACSB) in Accounting, General Business, Management, Economics, Finance, Information Systems, Marketing, and International Business. Qualifications include leadership and management skills, and a capacity to work effectively with internal and external constituencies. Earned doctorate in Business desirable. Application review begins December 1, 1999, and continues until position is filled. Submit letter, *curriculum vitae*, and five references to Dr. Hossein Nouri, Chair, Search Committee, Office of Academic Affairs, PO Box 7718, Ewing, NJ 08628-0718. Please visit our web site at http://www.tcnj.edu. TCNJ is an EOE/AA Employer.

138 UNIVERSITY OF NORTH TEXAS invites applications for a tenure-track position at the Assistant rank for teaching and research interest in Managerial Accounting beginning Fall 2000. Doctorate in Accounting or completion of the requirements by the fall employment date is required. The University of North Texas, located in the Dallas-Fort Worth metroplex, is a metropolitan research university with an enrollment in excess of 26,000 students. Accounting programs are offered at the undergraduate, master's, and doctoral levels. Applications will be considered until position is filled. Candidates should submit a letter of application, *curriculum vitae*, defended dissertation proposal or published article, and the names, addresses, and telephone numbers of four references to Dr. Richard Boley, Chair Department of Accounting Search Committee, College of Business, University of North Texas, PO Box 305219, Denton, TX 76203-5219. The University of North Texas is an ADA/AA/EOE that encourages applications from minority group members and women.

139 UNIVERSITY OF MARYLAND invites applications for a tenure-track/tenured position in Accounting Information Systems and Information Security, to start in August 2000. A strong research record is required. Send a *curriculum vitae*, three letters of recommendation, and evidence of research to Professor Oliver Kim, The Robert H. Smith School of Business, University of Maryland, College Park, MD 20742-1815. The University of Maryland is an Equal Opportunity/Affirmative Action Employer. Women and minorities are especially encouraged to apply.

140 UNIVERSITY OF MARYLAND seeks applicants for a continuing nontenure-track teaching position in Accounting. The position is for nine months beginning Fall 2000, and is renewable subject to performance. Off-term teaching is available. Candidates must possess a doctorate and an excellent teaching record, especially at the Master's level. Teaching breadth will be valued. Certain student support and service responsibilities will be expected. Send a *curriculum vitae*, three letters of recommendation, and evidence of teaching effectiveness to Professor Oliver Kim, The Robert H. Smith School of Business, University of Maryland, College Park, MD 20742-1815. The University of Maryland is an Equal Opportunity/Affirmative Action Employer. Women and minorities are especially encouraged to apply.

141 UNIVERSITY OF SOUTHERN MISSISSIPPI–GULF COAST, Division of Business Administration, seeks applicants for an anticipated tenure-track position in Accounting, beginning Fall 2000, with teaching responsibilities in Advanced Accounting and Tax. Applicants inclined to pursue academic research will receive preference. Position qualifications include a Ph.D. in Accounting. The University of Southern Mississippi–Gulf Coast is part of a dual-campus system with a main campus in Hattiesburg, serves two metropolitan statistical areas, and is AACSB-accredited. Applications should include current *curriculum vitae*, evidence of teaching and research effectiveness, a copy of doctoral transcript, and three letters of recommendations. Applications will be accepted until February 10, 2000, or until the position is filled. Contact Walt Taylor, Chair, USMGC-DBA, 730 E. Beach Blvd., Long Beach, MS 39560; Fax: (228) 865-4588; Email: w.taylor@usm.edu. AA/EOE/ADAI.

142 UNIVERSITY OF MARYLAND UNIVERSITY COLLEGE, OVERSEAS PROGRAMS, continually seeks experienced faculty for programs on U.S. military bases in Asia and Europe, and for residential campus in Schwäbisch Gmünd, Germany. Renewable annual appointments begin August 2000. Requirements include a doctorate, two master's, or considerable graduate work beyond the M.B.A.; recent college teaching experience; U.S. citizenship. Excellent for a sabbatical or leave of absence. Benefits include transportation and, where appropriate, military base privileges. Frequent relocation, local living conditions, and the cost of schooling make most of these positions difficult for those with children. For further information visit our web page: http://www.umuc.edu under "Faculty/Staff." Send resume to Dr. Rosemary B. Hoffmann, University of Maryland University College, Overseas Programs, College Park, MD 20742-1642 or via email (with mailing address): overseas-programs@umuc.edu. AA/EEO.

143 UNIVERSITY OF SOUTHERN INDIANA invites applications for the tenure-track position of Assistant Professor of Business Law, involving teaching of primarily undergraduate business law courses. USI's School of Business is AACSB-accredited with 1,500 undergraduate majors and 200 part-time M.B.A. and M.S.A. students, and over 40 full-time faculty. The Department of Accounting and Business Law, with ten full-time faculty members, offers undergraduate and graduate degrees in Accounting. The University is committed to excellence in teaching, outreach to the community and scholarship/professional activity. Position requires J.D. degree and evidence of research potential; effective teaching experience preferred. Competitive salary and benefits package. Application deadline is February 29, 2000, but applications will be accepted until position filled. Send letter of application, *curriculum vitae*, and list of three professional references to Dr. Kwangok Kim, Department of Accounting and Business Law, University of Southern Indiana, 8600 University Boulevard, Evansville, IN 47712 or email to HumanRes@usi.edu. AA/EOE. Women and minorities are encouraged to apply.

144 OAKLAND UNIVERSITY seeks applicants for a tenure-track, Assistant Professor position beginning in September 2000. We are looking for someone with a Cost/Managerial Accounting specialization. A secondary interest in AIS is helpful. Qualified candidates must possess a doctorate in Accounting, exhibit enthusiasm for teaching, and demonstrate an ability to conduct scholarly research leading to publication in academic journals. The normal workload is five courses per academic year. The undergraduate, M.B.A., and Master's of Accounting programs are AACSB-accredited. For more information about Oakland University, see http://www.Oakland.edu. Send a current *curriculum vitae*, copy of transcripts, sample of scholarly work (if available), and three letters of recommendation to Edward J. Farragher, Chair, Department of Accounting and Finance, Oakland University, Rochester, MI 48309-4493. Oakland University is an Equal Opportunity/Affirmative Action Employer and is especially interested in female and minority candidates.

145 UNIVERSITY OF GEORGIA, J. M. Tull School of Accounting, is seeking applications for a tenure-track position in Accounting at the Assistant Professor level with teaching responsibilities in Taxation or Managerial. The anticipated date of appointment is Fall 2000. Candidates for this position should have either a Ph.D. in Accounting or be well along in the dissertation stage. Applicants must have a commitment to excellence in teaching and scholarship. Salary and benefits are competitive. Applications received before January 15, 2000 are assured of consideration. Please submit application materials (current *curriculum vitae* and dissertation proposal or example of scholarly work) to Dr. Paul J. Streer, Chair, Faculty Recruiting Committee, J. M. Tull School of Accounting, 255 Brooks Hall, University of Georgia, Athens, GA 30602. The University of Georgia is an Equal Opportunity/Affirmative Action Institution and strongly encourages applications from women and minorities.

146 UNIVERSITY OF GEORGIA, J. M. Tull School of Accounting, is seeking applications for a nontenure-track position in Accounting. The initial appointment is for three years and can be renewed. The anticipated date of appointment is Fall 2000. Candidates for this position should have a Ph.D. in Accounting and have a record of accomplishments in Accounting instruction. It is anticipated that the Terry Teaching Fellow will teach Principles of Accounting (Financial or Managerial) and manage laboratory sessions taught by graduate students. Applications received before January 15, 2000 are assured of consideration. Please submit application materials to Dr. Paul J. Streer, Chair, Faculty Recruiting Committee, J. M. Tull School of Accounting, 255 Brooks Hall, University of Georgia, Athens, GA 30602. The University of Georgia is an Equal Opportunity/Affirmative Action Institution and strongly encourages applications from women and minorities.

147 UTICA COLLEGE invites applications for a tenure-track position to begin Fall 2000. Applicants must have earned a doctorate in Accounting or be close to completion. Professional certification is preferred. Duties include teaching undergraduate courses, scholarly research, and advising. The successful candidate will also be given the opportunity to help develop a master's degree program in Accounting and to teach graduate courses. Send letters of application, *curriculum vitae*, and names of three references to Stephen Neun, Associate Dean, Utica College, 1600 Burrstone Road, PO Drawer 104W, Utica, NY 13502. AA/EOE.

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Strategic Benchmarks in Earnings Announcements: The Selective Disclosure of Prior-Period Earnings Components

Catherine M. Schrand
University of Pennsylvania
Beverly R. Walther
Northwestern University

ABSTRACT: This paper provides evidence that managers strategically select the prior-period earnings amount that is used as a benchmark to evaluate current-period earnings in quarterly earnings announcements. Managers are more likely to separately announce a prior-period gain from the sale of property, plant, and equipment (PPE) than a loss. This strategy provides the lowest possible benchmark for evaluating current earnings, thereby allowing the manager to highlight the most favorable change in earnings. This strategic disclosure behavior is more likely to occur when it prevents a negative earnings surprise. The observed strategic disclosure decisions are consistent with a conjecture by managers that the nonrecurring nature of the prior-period gain/loss will be forgotten unless it is separately announced. Consistent with this conjecture, there is some evidence that equity investors, one potential target of strategic reporting, use the benchmark that managers provide in earnings announcements to evaluate current earnings, even when the components of this benchmark have different persistence. However, cross-sectional analyses provide no evidence that managers *ex post* exploit the equity mispricing that occurs between the earnings announcement date and the release of the financial statements.

We have received helpful comments from Ray Ball, Peter Easton, Thomas Lys, Robert Magee, Lawrence Revsine, Katherine Schipper, Doug Schroeder, Richard Sloan, Cliff Smith, Leonard Soffer, Ramu Thiagarajan, Jacob Thomas, Ro Verrecchia, Jerry Zimmerman, two anonymous referees, and seminar participants at Northwestern University, Ohio State University, University of Rochester, and the University of Pennsylvania Wharton School. We obtained analyst data from Zacks Investment Research and I/B/E/S. We gratefully acknowledge the contribution of I/B/E/S International Inc. for providing earnings-per-share forecast data, available through the International Brokers Estimate System. These data have been provided as part of a broad academic program to encourage earnings-expectation research. We appreciate the research assistance of Janet Lee and the financial support of the University of Pennsylvania Research Foundation and the Kellogg Graduate School of Management.

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Key Words: *Discretionary disclosure, Earnings management, Nonrecurring items, Market reactions.*

Data Availability: *Data are available from sources indicated in the text.*

I. INTRODUCTION

This paper provides evidence that managers strategically select the prior-period earnings amount that is used as a benchmark to evaluate current-period earnings in quarterly earnings announcements. Managers are more likely to separately announce a prior-period nonrecurring gain from the sale of property, plant, and equipment (PPE) than a loss. This strategy provides the lowest possible benchmark against which to evaluate current earnings, thereby allowing managers to highlight and discuss the most favorable change in earnings. In the text of the earnings announcement, firms that incurred a prior-period loss on the sale of PPE (hereafter, loss-firms) that do not separately mention the loss can emphasize the largest increase (or smallest decline) in current-quarter results relative to those from the comparable quarter of the prior year.[1] This strategic disclosure behavior is more likely to occur when it prevents a negative earnings surprise.

Strategic disclosure in earnings announcements is related to earnings management, but the manager is managing the perception of earnings rather than managing actual earnings. As in earnings management studies, our sample managers must believe that their behavior will not be unraveled. In the strategic-reporting context, managers must conjecture that the transitory nature of a prior-period gain/loss will be forgotten unless it is separately noted in the current-period earnings announcement. Consistent with this conjecture of a processing bias, stock price reactions to earnings announcements indicate that equity investors use the benchmark managers provide in the earnings announcement to evaluate current earnings, even when the components of this benchmark have different persistence. Although the mispricing is only temporary, these results suggest that strategic reporting at the earnings announcement date can affect the perceptions of one obvious target of strategic disclosure, equity investors. Further analysis, however, reveals that strategic-reporting behavior does not vary as a function of several variables identified in prior studies as incentives for "real" earnings management such as investor sophistication, subsequent securities issues, insider trading, and the propensity for litigation.

In summary, there is strong evidence of strategic reporting by managers, and some evidence that investors are misled by the reports. However, variables that proxy for the benefits of misleading equity investors do not explain the cross-sectional variation in managers' propensities to report strategically. There are several possible explanations for this combination of results. One explanation is simply that the cross-sectional tests lack power. The small sample, selected for the primary tests related to strategic reporting, limits our ability to detect cross-sectional variation in disclosure decisions associated with variables that proxy for the benefits from temporary mispricing. An alternative explanation is that strategic reporting of a prior-period nonrecurring item is costless. In this case, managers have incentives to behave strategically to create an option to exploit mispricing, even if *ex post* they do not. A final explanation is that managers' incentives to report strategically stem from sources other than equity investors, although a by-product of the strategic reporting decisions is the observed effect on stock prices.

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[1] For example, J&J Snack Foods (J&J) recognized a loss on the sale of PPE in the second quarter of 1990 (representing 390 percent of net income). In its earnings announcement, J&J announced this amount separately, and made all comparisons to the same quarter of 1989 both including and excluding the loss (*PR Newswire* 1990). However, in the second quarter of 1991, J&J announced only that "earnings soared 281 percent" over the comparable quarter of the prior year, not that the prior-year net income included a nonrecurring PPE loss and thus was artificially deflated (*PR Newswire* 1991). Adjusting for the nonrecurring charges from the previous year, earnings had actually declined 22 percent.

Our conclusions are based on the analysis of the strategic reporting of a particular nonrecurring item, significant gains and losses on the sale of PPE. This focus has two advantages. First, we can use disaggregated data in the statement of cash flows and 10-K schedules to identify the existence and amount of PPE gains/losses, even if the firm chooses *not* to discuss this item in the income statement, Management's Discussion and Analysis, or earnings announcement.[2] Financial statement data necessary to identify the existence of other types of nonrecurring items in the absence of voluntary disclosure are not required.

Second, we focus on PPE gains/losses because managers have more discretion in deciding whether to separately mention above-the-line items rather than below-the-line items. Although not required, many firms include summary income statements in earnings announcements. In these summary statements, PPE gains and losses are often aggregated with other above-the-line earnings components. In contrast, below-the-line items, such as extraordinary gains and losses, income and gains and losses from discontinued operations, and adjustments for changes in accounting principles, are generally disclosed separately in the summary income statement in the earnings announcement consistent with the separate reporting of these items in the income statement that is included in the annual report.[3]

While the focus on PPE gains and losses limits the extent to which we can generalize, we believe such strategic behavior is not limited to this particular component of income. As noted previously, this particular nonrecurring item was chosen, in part, because it is more easily identifiable using financial statement data. Other nonrecurring items, such as litigation costs or benefits, product warranty charges, environmental remediation costs, gains/losses on sales of investments in assets other than PPE, write-offs of intangibles, write-downs of real assets, or gains/losses from unusual/infrequent tax or regulatory changes, are more easily "hidden" in the financial statements, increasing the likelihood that firms can strategically disclose these items in the earnings announcement.

Anecdotal evidence suggests that firms use discretion over other earnings-related disclosures as well. For example, the *Wall Street Journal* (Bailey 1997, B4) criticized Waste Management when they disclosed in 1997 that 1996 earnings had included nonrecurring items and that these items were not "disclosed in the company's earnings release at the time." These nonrecurring items included "gains on sale of businesses, income from insurance-claim settlements and lower depreciation and expenses from casualty claims." Similarly, Coca-Cola announced that third-quarter net income for 1998 was flat compared to 1997 once gains from bottling transactions in 1998 and 1997 were eliminated, even though net income had actually decreased. In 1997, however, Coca-Cola had emphasized the recurring nature of these bottling gains as "an integral part of the soft drink business"

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[2] Despite these disclosures, we are still forced to eliminate some firms from the sample because we cannot measure the magnitude of the PPE gain/loss. The eliminated firms differ from the sample firms in that they have intentionally aggregated the PPE information, within the discretion allowed by APB No. 30, which the sample firms chose to provide. Although the decision to aggregate the PPE gain/loss with other information could be strategic, the lack of necessary information to separately identify the PPE gain/loss prevents the inclusion of these firms in the sample.

[3] In the year of recognition, some sample firms segregate the amount on the face of the income statements included in their annual reports as a gain or loss from the sale of PPE. The remaining firms include the gain/loss in nonoperating income, but do not identify the source or the amount. The financial statements for the firms that do not segregate the item are in compliance with APB No. 30 since the statement requires only that items that are unusual or infrequent (but not both) be included in nonoperating income. The statement precludes separately categorizing these items, if material, below income from continuing operations or including them in operating income. Our definition of "material" is that the gain or loss is large relative to actual unadjusted net income. The firms may judge materiality of the PPE gain/loss using other criteria.

(Lowenstein 1997, C1; Deogun 1998, A4). Likewise, Sony and Gabelli Asset Management have been accused of strategically choosing benchmarks to present current earnings in the most positive light (McGeehan 1999, C4). Strategic selection of benchmarks does not appear to be limited to earnings announcements. Byrd et al. (1998) and Soffer (1998), for example, also document that firms strategically select a benchmark to maximize relative performance measures in proxy statements.

The paper is organized as follows. Section II discusses managers' incentives to strategically mention a prior-period nonrecurring item in a current-period earnings announcement. Section III describes the sample and explains why we examine prior-period gains or losses from PPE sales. The factors that are associated with managers' disclosure decisions are presented in Section IV. Section V examines equity market reactions to earnings announcements as one possible incentive for strategic reporting, and then analyzes cross-sectional variation in managers' decisions to strategically announce prior-period nonrecurring items. Conclusions follow in Section VI.

II. STRATEGIC ANNOUNCEMENT OF THE COMPONENTS OF EARNINGS

This paper investigates whether managers strategically choose a benchmark earnings number to present in the earnings announcement to evaluate current earnings. Specifically, we analyze a firm's decision to mention separately a nonrecurring prior-period earnings component in a current-period earnings release. For expositional convenience, we refer to such announcement decisions as "strategic" if mentioning or not mentioning the item appears to reflect an attempt to influence readers' perceptions of the change in earnings.

This paper focuses on disclosures by firms that have a nonrecurring item in the prior year, but not in the current year, because these firms have the most discretion to strategically select the earnings benchmark. All firms generally include some prior-period quarterly earnings number in current-period earnings announcements as a benchmark.[4] A common benchmark is total prior-period earnings. However, when current-period earnings does not contain any nonrecurring items, a manager can justify presenting a prior-period amount that has been adjusted for nonrecurring items because the adjustment makes prior-period and current-period earnings more comparable. The adjustment is also justified because persistent earnings, which is better represented by prior-period "adjusted earnings," should receive more weight than transitory earnings in predicting future earnings (Foster 1977; Kormendi and Lipe 1987; Easton and Zmijewski 1989; Freeman and Tse 1992). The benchmark that is presented affects the magnitude, and possibly the sign, of the change in earnings that the manager discusses and evaluates in the earnings announcement.

"Strategic" reporting of a prior-period nonrecurring item implies that managers hold two beliefs. First, managers must believe that current-period earnings are evaluated against the prior-period earnings benchmark. This belief is reasonable because, as discussed above, earnings announcements commonly provide historical earnings.[5] Second, managers must believe that the components of prior-period earnings will be ignored when they are not mentioned separately in the current-period earnings announcement. That is, managers must believe that there is some probability that investors and other readers will rely on the earnings benchmark that managers present to evaluate current earnings, even if this benchmark is not the one most comparable to current-period earnings in terms of earnings persistence. If instead managers believe that earnings adjusted for the gain/loss will be used as the benchmark even when the prior-period gain/loss is not separately mentioned, managers have no incentives to make strategic disclosures.

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[4] Firms registered on the New York Stock Exchange are required to announce the current quarter's total earnings and are encouraged to include "like figures of the same period of the previous year, to afford a basis for comparison" (New York Stock Exchange 1995, para. 203.02(C)).

[5] However, as Beatty et al. (1995) discuss, there is a lack of consensus in the earnings management literature about the benchmark toward which earnings are managed. While some studies have investigated earnings management relative to firm-specific time-series benchmarks, including prior-period earnings (e.g., Bartov 1993; Collins et al. 1995), other studies have focused on management relative to a cross-sectional benchmark, such as an industry average (e.g., Barth et al. 1990; Scholes et al. 1990; Clinch and Magliolo 1993; Haw et al. 1991), or firm-specific, non-time-series benchmarks, such as analysts forecasts (e.g. Robb 1998).

In the analysis, we examine which of two possible disclosure strategies is more consistent with observed disclosure decisions. One disclosure strategy is to maximize the increase (or minimize the decrease) in earnings that is highlighted in the earnings announcement by lowering the prior-period earnings benchmark (the "maximization objective"). A second strategy is to minimize the absolute value of the highlighted change in earnings (the "smoothing objective"). Prior literature has found support for both maximization and smoothing behavior (Bartov 1993; Dechow 1994; Burgstahler and Dichev 1997; Degeorge et al. 1999). A manager's incentives to strategically announce can also depend on the sign and magnitude of the firm's earnings realization in the announcement quarter if the objective of strategic reporting is to avoid a negative earnings surprise. In Section IV, we outline predictions about strategic announcement in the case of maximization and smoothing objectives, and conditional on the earnings realization.

The discussion to this point has been silent about whose perceptions managers are attempting to influence through their reporting decisions. The analysis of reporting decisions does not depend on the intended target of strategic reporting. However, a question that arises naturally is whose perceptions are managers trying to influence? We provide some preliminary evidence on this issue by examining stock market reactions to earnings announcements and analyzing cross-sectional determinants of strategic reporting under the assumption that equity investors are a likely target of the report.

We focus on the effects of strategic reporting only on equity investors' perceptions of the change in earnings because of existing evidence on equity investors' processing biases. There is evidence that some investors fixate on information reported to them (e.g., Hand 1990). Further, investors do not fully incorporate information on the persistence of earnings or earnings components, leading to post-earnings-announcement drift, and postpone a more complete reaction to earnings information until more information is released (see Freeman and Tse 1989; Bernard and Thomas 1990; Abarbanell and Bernard 1992; Sloan 1996; Soffer and Lys 1999). By contrast, other potential targets of strategic reporting, such as compensation committees, regulators, and creditors, are less likely to rely exclusively on information revealed in an earnings announcement. For example, Dechow et al. (1994) document that compensation committees adjust earnings-based compensation for restructuring charges. In addition, it is difficult to specify appropriate analyses to identify the reactions of parties such as creditors, regulators, or compensation committees to strategic reporting.

III. SAMPLE AND DESCRIPTIVE STATISTICS

Sample Selection Criteria

Although required financial statement disclosures make PPE gains and losses more easily identifiable than other above-the-line nonrecurring items, Compustat does not report a "clean" amount that represents a quarterly gain or loss on the sale of PPE. We use two approaches to determine observations that represent a material quarterly PPE-related gain or loss. The first sample of potentially material quarterly gains and losses is based on the actual gain/loss amount reported as a reconciling item in the operating section of the statement of cash flows (annual Compustat item 213, quarterly Compustat item 102). Annual amounts are collected in addition to quarterly amounts because for many firms the quarterly amount is missing from Compustat. For the *annual* observations, we analyze various firm reports (including the 10-K, 10-Q, and annual report) to determine the *quarterly* gain/loss amount and whether it is material on a quarterly basis. The second sample of potentially material quarterly gains and losses is generated by calculating the gain or loss amount as the proceeds from the sale of PPE reported in the statement of cash flows (annual Compustat item 107) less the net book value of retired PPE reported in Schedules V and VI in the 10-K (annual Compustat items 184 and 221, respectively). Because this amount can be calculated only on an annual basis, we analyze various firm reports to determine the material *quarterly* gain/loss amount, if any.

In the years from 1988 through 1994, there are 6,319 observations with annual gains or losses on the sale of PPE that exceed 5 percent of annual income before extraordinary items, in absolute value, or a quarterly gain or loss that exceeds 5 percent of quarterly income before extraordinary items. The sample period is restricted to post-1987 because we require data from the statement of cash flows. The sample period ends in 1994 because we require data from Schedules V and VI in 10-Ks, and these schedules were not required after this date.

In addition to containing both annual and quarterly amounts, this initial sample overstates the number of observations that represent occasional sales of PPE because of data aggregation by Compustat and by firms. The most significant overstatement occurs because the statement of cash flow items on Compustat can include gains or losses on sales of fixed assets even if the sales are an operating activity for a firm. For example, firms in the oil and gas or timber industries sell properties on a recurring basis and manufacturers of heavy equipment sell this equipment on a recurring basis, but Compustat aggregates the gains or losses on these sales with the gains or losses on occasional sales of assets. From the sample of 6,319 observations, we eliminate those that we believe are misclassifications of gains or losses related to operating activities. As an alternative to hand-collecting information about the nature of the sales for the 6,319 observations, we claim that firms that have material gains or losses in at least five of the eight sample years are most likely to be misclassifications of this type. Using this criterion, we eliminate 570 firms (representing 4,417 observations). Of these 570 firms, 500 have significant gains or losses on the sale of PPE as identified by our initial Compustat screens in every year for which Compustat data are available (i.e., not just in five years).

While this methodology is somewhat *ad hoc* and likely eliminates some observations that represent gains/losses on nonrecurring sales, *ex post* analysis of the eliminated firms suggests that it successfully captures observations for which the sale of PPE is an integral part of the firm's operating activities. For these observations, the gain/loss amount as reported on Compustat is a predictor of future earnings.[6] Further, the industry membership of the 570 eliminated firms suggests that the gains/losses are related to sales that are more of an operating activity than an occasional PPE sale.[7]

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[6] In a regression of total earnings from year t on earnings from continuing operations from year t − 1, earnings from noncontinuing operations from year t − 1, and the gain/loss amount for year t − 1 (where t − 1 is the year of the PPE sale), the coefficient on the gain/loss amount is statistically significant at two-tailed probability < 0.01 (results not tabulated). The magnitude of the coefficient on the gain/loss amount is not statistically different from the magnitude of the coefficient on continuing operations.

[7] The observations are concentrated in the following industries: oil and gas extraction (10.2 percent), food and kindred products (7 percent), paper and allied products (6.5 percent), fabricated metals, except machinery (13.5 percent), machinery, except electrical (6.5 percent), transportation equipment (4.9 percent), measuring instruments (8.2 percent), nondurable goods—wholesale (5.9 percent), eating and drinking places (9.9 percent), and business services (8.4 percent). As an example of the misclassification problem, the gains and losses for firms in the "eating and drinking places" category include gains and losses on sales of franchises or company-owned locations.

Another problem with the Compustat data is that "Sale of Property, Plant, and Equipment and Sale of Investments—Loss (Gain)" (Compustat item 213) and "Sale of Property, Plant, and Equipment (Flow of Funds Statement)" (Compustat item 107) include transactions related to sales of assets other than PPE. The Schedules V and VI data allows us to identify the amount, if any, of the Compustat number that corresponds to PPE sales for the 1,902 remaining observations that potentially represent nonrecurring gains or losses. When the gain/loss amounts determined from the statement of cash flows and schedules are different, we read the annual report, 10-K, and 10-Q to determine the correct PPE gain or loss amount and the quarter in which it occurs. This analysis results in the elimination of 450 observations for which the gain/loss is (1) not related to PPE (Compustat misclassifications), (2) immaterial after correcting Compustat errors, (3) related to PPE sales associated with plant closings or sales of a line of business (including manufacturing rights),

TABLE 1
Sample Selection

	Number of Observations
Observations with a gain or loss on the sale of PPE[a] ≥ 5% of annual or quarterly income before extraordinary items during the period 1988–1994	6,319
Less: Observations related to firms with a significant gain or loss in five or more years	(4,417)
	1,902
Less: Unusable observations[b]	(450)
Less: Firms missing data on CRSP, Compustat, or observations with an indeterminate gain/loss amount or quarter of gain/loss recognition	(559)
Less: Observations in consecutive years	(472)
Less: Firms in bankruptcy	(12)
Less: Firms restructuring in either the year of recognition or the subsequent year	(111)
Less: Observations where the quarterly gain or loss is immaterial relative to quarterly income before extraordinary items	(131)
	167
Less: Firms missing earnings announcements	(34)
Less: Firms announcing earnings after releasing financial statements	(3)
Usable observations	130

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[a] Based on the reconciling item from the statement of cash flows, or calculated as proceeds from sales less the net book value of PPE sold.

[b] Observations are unusable if the gain or loss is (1) not related to PPE (Compustat misclassifications), (2) immaterial after correcting Compustat errors, (3) related to a sale associated with plant closings or sales of a line of business (including manufacturing rights), (4) recorded prior to the execution of the sale, or (5) recorded in U.S. dollars but available reports are only in a foreign currency.

TABLE 2
Sample Descriptive Statistics for Size, Leverage, Earnings and the Impact of PPE Sales

	Total Sample *(n = 130)*		*Industry Averages*[b] *(n = 130)*		*Gain-Observations*[c] *(n = 79)*		*Loss-Observations*[d] *(n = 51)*	
Variable[a]	*Mean*	*Median*	*Mean*	*Median*	*Mean*	*Median*	*Mean*	*Median*
MKTVAL	142.19*	48.17*	1,446.31	689.89	138.93	56.07	147.25	36.55
REVS	164.52*	60.00*	1,461.31	680.58	159.05	59.58	172.99	60.14
TA	135.00*	48.52*	1,681.20	542.99	138.79	50.01	129.14	39.66
ΔREVS	0.08	0.04*	0.11	0.07	0.10	0.04	0.05	0.04
ΔTA	0.05*	0.04*	0.11	0.06	0.06	0.06	0.03	0.03
DEBT/EQ	0.30	0.26	0.26	0.27	0.28	0.21	0.33	0.29
EPS-XO	0.42*	0.25*	0.89	0.85	0.64†	0.42†	0.09	0.18
"AS-IF" EPS-XO	0.36	0.27	—	—	0.48	0.30	0.16	0.23
EPS	0.45*	0.31*	0.88	0.88	0.69†	0.46†	0.08	0.19
"AS-IF" EPS	0.39	0.29	—	—	0.53	0.32	0.16	0.25
NBV/TA	0.014*	0.006	0.007	0.005	0.015	0.005†	0.014	0.008

(*Continued on next page*)

TABLE 2 (Continued)

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* The total sample is statistically different from the industry averages sample at the 10 percent level based on a t-statistic (for means) and Wilcoxon rank-sum test (for medians).

† The gain-observations are statistically different from the loss-observations at the 10 percent level.

[a] Variable definitions:

MKTVAL = the market value of common stock outstanding (Compustat data item 199 times item 25) plus long-term debt (item 9) plus debt in current liabilities (item 34) plus the carrying value of preferred stock (item 130) at the end of the fiscal year of the PPE sale ($MM).
REVS = total revenues (item 12) for the fiscal year of the PPE sale ($MM).
TA = total assets (item 6) at the end of the fiscal year of the PPE sale ($MM).
ΔREVS = the annual percentage change in revenues over the year prior to the year of recognition of the PPE gain or loss.
ΔTA = the annual percentage change in total assets over the year prior to the year of recognition of the PPE gain or loss.
DEBT/EQ = long-term debt plus debt in current liabilities divided by MKTVAL at the end of the fiscal year of the PPE sale.
EPS-XO = annual earnings per share before extraordinary items for the fiscal year of the PPE sale.
"AS-IF" EPS-XO = annual earnings per share before extraordinary items excluding the PPE gain or loss for the fiscal year of the PPE sale.
EPS = annual earnings per share for the fiscal year of the PPE sale.
"AS-IF" EPS = annual earnings per share excluding the PPE gain or loss for the fiscal year of the PPE sale.
NBV/TA = the net book value of the PPE sold divided by total assets at the end of the fiscal year of the PPE sale.

[b] The industry averages represent the four-digit SIC codes of the sample observations in the year of the gain or loss.

[c] Observations in the total sample with PPE gains.

[d] Observations in the total sample with PPE losses.

(4) recorded prior to the execution of the sale (losses only), or (5) recorded in U.S. dollars but the financial statements are available only in a foreign currency.

We also eliminate 559 observations over the eight-year sample period for which financial statements are not available, that are missing CRSP or Compustat data, or that do not provide sufficient information in their financial statements to determine the actual gain/loss amount or the quarter of recognition. We eliminate 472 observations that have a gain/loss which is greater than 5 percent of income in the subsequent year. A nonrecurring item in the current-period limits the manager's ability to justify strategically announcing only the components of prior-period earnings. We exclude 123 observations that correspond to firms in bankruptcy during either the year of the PPE sale or the year following the sale, and firms that report initiating or completing any restructuring of operations that might involve the sale of PPE. This elimination further decreases the likelihood that PPE gains and losses are correlated with an event of real economic significance for the firm.

Finally, we exclude the *annual* observations for which the quarterly amount, once identified, was insignificant based on the 5 percent criterion (131 observations). The remaining observations represent material quarterly gains or losses on the sale of PPE. Firms that are missing earnings announcements (34 observations) and firms that announce earnings after the release of their financial statements (three observations) are also eliminated from the sample.

Table 1 summarizes the sample selection criteria and the resulting number of sample firms and observations. The total sample includes 130 observations (79 gains and 51 losses) representing 123 firms. The seven firms with multiple observations have gains or losses in nonconsecutive years. For these 130 firms, we read the financial statements and 10-Ks to determine the circumstances surrounding the gain/loss on the sale of PPE. The PPE sales for our sample firms occurred in the ordinary course of business, consistent with our attempt to identify firms with nonrecurring gains/losses from nonoperating activities. The PPE sales in our sample occur most frequently in the fourth quarter (98 of the 130 observations). The high proportion of fourth-quarter sales is most striking for loss-observations (88 percent), but is also observed for gain-observations (67 percent).

Descriptive Statistics

Table 2 provides descriptive statistics about the sample firms relative to industry-averages matched to the sample on the basis of year and four-digit SIC codes. Compared to the industry-averages, the sample firms are small as reflected in market capitalization (MKTVAL), revenues (REVS), and total assets (TA). The sample firms also exhibit slower median growth rates in total assets and revenues than the industry averages over the year prior to the year of the PPE sale. Despite the size and growth differences, the sample firms are not significantly different from their industry counterparts with respect to leverage.

Although the gain/loss amount is significant relative to accounting earnings, the sample PPE sales do not represent extreme economic events in terms of the disposal of earnings-generating assets. The median net book value (NBV) of the retired assets is 0.6 percent of total assets for the sample firms. For the industry averages, median PPE sales are 0.5 percent of total assets. The mean PPE sales of the sample firms, however, are significantly higher than the industry averages because of skewed data in the small sample. The similarity of the median values is consistent with an objective to identify firms for which the PPE sale has significant accounting consequences, but does not indicate a major change in the firm's core operations.

Table 2 compares gain- and loss-observations because several of the empirical tests are based on the sign of the prior-period nonrecurring item. There are no significant differences in size, growth, leverage, or "as-if" annual earnings between gain- and loss-firms. Therefore, the tests of gain-observations vs. loss-observations are not confounded by cross-sectional differences in these firm-specific characteristics.

IV. STRATEGIC DISCLOSURE IN EARNINGS ANNOUNCEMENTS

Predictions

The reporting strategy that a manager follows depends on the manager's objectives. We consider two disclosure objectives: (1) maximize (minimize) the highlighted increase (decrease) in earnings by lowering the prior-period earnings benchmark, or (2) smooth the highlighted change in earnings by providing the benchmark that is closest to current-period earnings. We also investigate if the incentives to strategically mention a prior-period nonrecurring item are conditional on the level of the current-period earnings realization because it can affect the sign of the earnings surprise.

When a manager's objective is to minimize the earnings benchmark, thereby highlighting the most favorable change in earnings, the announcement decision depends only on the sign of the nonrecurring item. The manager will announce a prior-period nonrecurring gain and not announce a prior-period loss. For gains, this strategy focuses attention on adjusted earnings as the benchmark for evaluating current earnings and highlights the change in adjusted earnings, which is more favorable than the change in total unadjusted earnings. In the case of a prior-period nonrecurring loss, *not* mentioning separately the loss provides the lowest benchmark and focuses attention on the most favorable change in earnings, which is the change in total unadjusted earnings. If a manager were to separately mention the prior-period loss, the earnings announcement would highlight that prior-period earnings are artificially low and any change in earnings for the year would appear less favorable.

When a manager's objective is to smooth the highlighted change in earnings, the announcement decision depends only on the relative magnitudes of the change in total unadjusted earnings and the change in adjusted earnings. The manager will separately announce the nonrecurring item if the absolute value of the change in earnings per share adjusted for the nonrecurring item ($|\Delta ADJEPS|$) is less than the absolute value of the change in total unadjusted earnings per share ($|\Delta EPS|$). For either gains or losses, this strategy focuses attention on the smallest change in earnings (in absolute value). An income-smoothing objective is consistent with empirical evidence that managers smooth income through real transactions or earnings management (e.g., Bartov 1993; Dechow 1994).[8]

Not all firms have equal incentives to either maximize or smooth the change in earnings that is emphasized in the earnings announcement. Recent empirical evidence suggests that managers use earnings management to avoid negative earnings surprises (e.g., Barth et al. 1999; Burgstahler and Dichev 1997; Degeorge et al. 1999).[9] Similarly, in certain situations, a manager can affect the sign of the earnings surprise that is discussed in the earnings announcement through strategic choice of the prior-period earnings benchmark. Managers can change a negative surprise to a positive surprise by strategically announcing a prior-period PPE gain (or not announcing a loss) if current-period earnings fall between adjusted and unadjusted earnings. If current-period earnings are less than both adjusted and unadjusted earnings, managers can strategically adjust the earnings benchmark to reduce the magnitude of the negative earnings surprise. Hence, a manager's incentives to alter the prior-period benchmark can depend on the level of the current-period earnings realization.

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[8] Ronen and Sadan (1981) and Watts and Zimmerman (1986) summarize the theories and empirical evidence on income smoothing.

[9] Baber et al. (1991) provide results consistent with managers reducing R&D expenditures to avoid showing a negative earnings surprise.

Results

This section reports the analysis of firms' earnings-announcement decisions. Because the prior-period nonrecurring amount is publicly available information at the time of the

TABLE 3

Analysis of Firms' Decisions to Remind about Prior-Period Gains and Losses from the Sale of PPE[a]

Tests of the Maximization Objective for Remind Decisions

Panel A: Univariate Comparison of Remind Decisions Based on the Sign of the Prior-Period Item

REMIND	*PPE GAIN*	*PPE LOSS*	*Total*	*p-value*[b]
Yes	23	3	26	0.001
No	56	48	104	
	79	51	130	

Panel B: Logit Analysis of the Association between the Likelihood of Reminding and the Sign of the Prior-Period Item

Equation (1):[c] $REMIND_j = \delta_0 + \delta_1 GAIN_j + \delta_2 \lvert GL \rvert_j + \delta_3 LNMV_j + \omega_j$

n	*Intercept*	*GAIN*	$\lvert GL \rvert$	*LNMV*	*LR Test*[d]
126	−0.571	0.165	0.610	0.051	28.017
	(0.000)	(0.031)	(0.008)	(0.011)	(0.000)

Tests of the Smoothing Objective for Remind Decisions

Panel C: Univariate Comparison of Remind Decisions Based on the Absolute Value of the Change in Earnings

REMIND	$\lvert \Delta ADJEPS \rvert < \lvert \Delta EPS \rvert$ *(Smoothers)*	$\lvert \Delta ADJEPS \rvert > \lvert \Delta EPS \rvert$ *(Nonsmoothers)*	*Total*	*p-value*[b]
Yes	14	11	25	0.298
No	46	58	104	
	60	69	129	

Panel D: Logit Analysis of the Association between the Likelihood of Reminding and the Absolute Value of the Change in Earnings

Equation (1):[c] $REMIND_j = \delta_0 + \delta_1 SMOOTH_j + \delta_2 \lvert GL \rvert_j + \delta_3 LNMV_j + \omega_j$

n	*Intercept*	*SMOOTH*	$\lvert GL \rvert$	*LNMV*	*LR Test*[d]
125	−0.548	0.106	0.877	0.051	24.818
	(0.000)	(0.097)	(0.000)	(0.011)	(0.000)

(Continued on next page)

TABLE 3 (Continued)

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[a] This table provides univariate and logit analysis of the determinants of firms' decisions to separately announce the prior-period components of earnings in the earnings announcement (REMIND). Panels A and B test the maximization objective for the selection of the earnings benchmark. Panel A shows the frequencies of observations classified according to whether the item is a gain or loss. Panel B presents the results of a logit analysis of the likelihood that a firm reminds as a function of the sign of the prior-period item. Panels C and D test the smoothing objective for the selection of the earnings benchmark. Panel C shows the frequencies of observations classified according to the magnitude of the change in adjusted EPS (|ΔADJEPS|) relative to the change in unadjusted EPS (|ΔEPS|). Panel D presents the results of a logit analysis of the likelihood that a firm reminds as a function of the magnitude of the change in adjusted EPS (|ΔADJEPS|) relative to the change in unadjusted EPS (|ΔEPS|). Panels B and D provide the estimated marginal effects from the logit model of the relation between the likelihood that a firm reminds and explanatory variables. The marginal effects of the regressors on the probabilities are: $\partial Y / \partial x_i = \Lambda(\delta'x)(1 - \Lambda(\delta'x))\delta$, where Y = dichotomous dependent variable; x = vector of independent variables; x_i = ith independent variable; Λ = the logistic cumulative distribution function; and δ = vector of coefficient estimates. The derivative is calculated at the means of the regressors. p-values for the coefficient estimates are in parentheses.

[b] p-value of a Pearson χ^2 test of the homogeneity across classifications.

[c] Variable definitions:

GAIN = an indicator variable which equals 1 for gain-observations and 0 for loss-observations.
SMOOTH = an indicator variable which equals 1 if |ΔEPS| > |ΔADJEPS| and 0 otherwise.
|GL| = the absolute value of the prior-period gain/loss per share.
LNMV = the natural logarithm of the market value of equity.

[d] Likelihood Ratio Test: $\dfrac{-2 * \text{Log-likelihood at Convergence}}{\text{Restricted Log-likelihood}} \sim \chi^2(k)$

where k = the number of parameters in the model − 1. The logit model presented in Panel B correctly classifies eight of 24 (96 of 102) remind (nonremind) observations. The logit model presented in Panel D correctly classifies seven of 23 (96 of 102) remind (nonremind) observations.

current-period earnings announcement, we say that a firm "reminds" readers about the nonrecurring item if management identifies this source of income from quarter q − 4 in the text of the earnings announcement for quarter q, and/or separately notes the gain or loss in the condensed financial statements that are included in the earnings announcement. We examine all available earnings announcements including those from the *Dow Jones News Retrieval Service, Reuters, PR Newswire, Business Wire,* the *New York Times,* and local newspapers. These publications perform minimal editing of the announcements that managers provide for release.[10] Therefore, we attribute the observed disclosure decisions to managerial intent.

Table 3 provides univariate and logit tests of the determinants of the announcement decisions in the year following the PPE sale. Panel A classifies the firms' disclosure decisions based on the sign of the nonrecurring amount generated by the sale of PPE (gain or loss). The analysis reveals that managers are more likely to adjust the prior-period earnings benchmark for a nonrecurring gain than for a loss. Only three of the 51 (6 percent) observations with prior-period nonrecurring losses remind investors about them in the earnings announcements. This number compares to 23 gain-observations that remind, which represents approximately 29 percent of the sample of 79 gain-observations. These relative frequencies are significantly different at the 0.001 level based on a Chi-square test. The greater propensity to remind readers about prior-period nonrecurring gains than about losses is consistent with an objective to minimize the earnings benchmark emphasized in the earnings announcement, thereby highlighting the most favorable change in earnings.

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[10] The editorial offices at the major wire services indicated that the wire services generally do not edit earnings announcements. *Business Wire* and *PR Newswire* edit press releases only for grammar (such as commas, decimal points, and AP style) and verify any changes with the firm. *Dow Jones* tabulates all numbers in a firm's earnings release. Any text in the release, such as a discussion of the components of prior-period earnings, is included either immediately below the table or as a separate release. *Reuters* follows similar editing guidelines. The results are qualitatively similar if we exclude announcements from *Dow Jones* and *Reuters*.

Although the frequency of reminder is significantly higher for gain- than loss-observations, the relatively low frequency of observed remind decisions by gain-firms (29.1 percent) does not support our predictions. Materiality is one explanation for this low frequency. For the gain-observations that remind, the average amount of the per-share gain is 188 percent of the unadjusted change in quarterly earnings per share ($|GL|/|\Delta EPS|$). This significantly exceeds the 78 percent average gain for the firms that do not remind ($p < 0.06$).[11] This difference suggests that the magnitude of the prior-period nonrecurring gain likely affects managers' remind decisions. By contrast, the average magnitude of the losses for the firms that remind (40 percent) is less than the magnitude for the firms that do not remind (83 percent), suggesting that materiality does not increase a firm's propensity to remind about a prior-period loss.[12] The small sample of loss-firms that remind, however, precludes statistical inferences about the impact of materiality on loss-firms' disclosure decisions.

We perform two additional analyses to assess the impact of materiality on the results. First, we reconstruct the contingency table after eliminating observations for which the gain/loss is "immaterial." Although the firms in the sample were selected based on the magnitude of the gain/loss amount, the sample selection methodology potentially selects firms with low net income, not large gain/loss amounts. As evidence of this potential misclassification, 13 sample observations have a gain/loss amount that is less than $25,000 in absolute value. Independence tests that exclude these observations show that a slightly higher percentage of gain-observations remind than in the full sample (23 of 72 gain-observations, or 32 percent).[13]

Second, we estimate the following logit model that controls for the magnitude of the gain/loss:

$$REMIND_j = \delta_0 + \delta_1 GAIN_j + \delta_2 |GL|_j + \delta_3 LNMV_j + \omega_j \qquad (1)$$

where $REMIND_j$ equals 1 if firm j separately mentions the prior-period gain/loss that occurred in quarter q in its earnings announcement for quarter q + 4, and equals zero otherwise. The indicator variable, GAIN, equals 1 if the prior-period nonrecurring item is a gain, and zero otherwise. The maximization objective predicts the estimated coefficient on GAIN is positive if managers are more likely to strategically adjust the earnings benchmark for prior-period PPE gains than losses. The model includes the absolute value of the nonrecurring gain or loss on a per-share basis ($|GL|$). The coefficient on $|GL|$ will be positive if materiality increases the probability that a manager reminds. The model also includes the natural logarithm of the market value of equity (LNMV) to control for firm size, which proxies for the tendency of a firm to disclose information and the amount of information available about a firm (Atiase 1985; Lev and Penman 1990).

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[11] We scale the gain/loss by the change in unadjusted total earnings (instead of market capitalization or price) to evaluate the effect that the manager's decision about announcing the gain/loss amount will have on the unexpected portion of *unadjusted* earnings per share (assuming a seasonal random walk model of earnings). One problem with this measure is that the unadjusted total EPS in the quarter of the PPE sale contains the gain/loss amount. Therefore, $GL/|\Delta EPS|$ is overstated (understated) in the year following the PPE sale for gain (loss) firms. However, since we are using this variable to make comparisons within either the gain or loss subsamples, this bias should not affect our conclusions.

[12] The mean of $|GL|/|\Delta EPS|$ for firms that remind about prior-period losses excludes one observation for which unexpected unadjusted earnings is equal to zero.

[13] This definition of immateriality is somewhat *ad hoc*, so we repeated the analysis using two alternative definitions. First, an observation is defined as immaterial if the gain/loss amount is less than 0.25 percent of quarterly revenues (10 percent of the sample). Second, an observation is immaterial if the firm's quarterly income before extraordinary items is in the lowest quartile of the sample firms but in the highest quartile based on $|GL|$ scaled by the absolute value of quarterly income before extraordinary items (14 percent of the sample). The results are robust to both definitions of materiality.

The logit analysis that controls for firm size and the absolute magnitude of the nonrecurring item (Table 3, Panel B) confirms that the sign of the nonrecurring item is an important determinant of the remind decision.[14] The positive and significant coefficient estimate on GAIN indicates that firms with gains are more likely to remind than are firms with losses, consistent with an objective to minimize the earnings benchmark and discuss the most favorable change in earnings. In addition, the positive and significant coefficient estimate on $|GL|$ ($p < 0.01$) indicates that the probability that the manager will separately mention the item in the earnings announcement increases with the materiality of the gain/loss amount. The findings are not sensitive to scaling $|GL|$ by revenues or total assets. Larger firms are also more likely to separately mention the nonrecurring item as indicated by the statistically positive ($p < 0.02$) estimated coefficient on firm size (LNMV).

In contrast, Panels C and D of Table 3 reveal that the remind decisions are not consistent with an objective of smoothing the change in earnings that is emphasized in the earnings announcement. Panel C of Table 3 classifies the firms' disclosure decisions based on the absolute magnitude of the change in adjusted quarterly EPS ($|\Delta ADJEPS|$) relative to the change in total quarterly EPS ($|\Delta EPS|$).[15] If managers strategically adjust the benchmark in order to smooth earnings, then the 60 firms with $|\Delta ADJEPS|$ less than $|\Delta EPS|$ are predicted to remind. However, only 14 of these firms (23 percent) separately mention the nonrecurring item. The 69 firms with $|\Delta ADJEPS|$ greater than $|\Delta EPS|$ will have a smoother perceived earnings stream if they do not remind. Eleven of these firms (16 percent) separately mention the item. The Chi-square statistic for this classification does not reject independence (p-value = 0.289).

Regardless of the smoothing incentive, the average of $|GL|/|\Delta EPS|$ is statistically greater for firms that remind than firms that do not remind. When reminding smoothes the change in reported earnings ($|\Delta ADJEPS|$ is less than $|\Delta EPS|$), the average of $|GL|/|\Delta EPS|$ is 70 percent for remind firms vs. 33 percent for nonremind firms ($p < 0.01$). When $|\Delta ADJEPS|$ is greater than $|\Delta EPS|$, the average of $|GL|/|\Delta EPS|$ is 311 percent for remind firms and 118 percent for nonremind firms ($p < 0.07$). When we eliminate the 13 firms for which the absolute value of the gain/loss is less than \$25,000, 14 of 55 (25 percent) firms with $|\Delta ADJEPS| < |\Delta EPS|$ remind and 11 of 61 (18 percent) firms with $|\Delta ADJEPS| > |\Delta EPS|$ remind. The Chi-square statistic to test independence remains insignificant ($p = 0.332$). This analysis suggests that materiality does not confound our evidence against the smoothing objective for remind decisions.

The logit results generally confirm that the observed remind decisions are not consistent with a smoothing objective.[16] Panel D replaces GAIN in equation (1) with an indicator variable, SMOOTH, that equals 1 if $|\Delta ADJEPS|$ is less than $|\Delta EPS|$, zero otherwise. The estimated coefficient on SMOOTH will be positive if managers strategically disclose the prior-period PPE gain/loss to smooth the change in earnings. Controlling for the magnitude of the gain/loss and firm size, we find that the estimated coefficient on SMOOTH is positive and marginally significant ($p < 0.10$). However, if we scale the gain/loss amount by total assets or revenues, the estimated coefficient on SMOOTH becomes insignificant. Estimating equation (1) with both indicator variables, one to measure the incentive to maximize the change in earnings (GAIN) and the other to measure the incentive to smooth the change in earnings (SMOOTH), the coefficient on GAIN remains positive and statistically significant, while the coefficient on SMOOTH is insignificant (results not shown).

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[14] In reporting the results for equation (1), we provide slope estimates of the associations between the independent variables and the probability that the firm reminds, which are implied by the logit coefficient estimates. Thus, the reported marginal probabilities can be interpreted like coefficient estimates from ordinary least squares estimation.

[15] These tests use 129 observations because EPS is missing for one observation.

[16] Consistent with the observed disclosure decisions, firms in our sample do not appear to be using the PPE sale to smooth income. For the year of the PPE-related gain/loss recognition, the sample firms with gains (losses) do not have statistically lower (higher) nonoperating income, or income from special items, extraordinary items, discontinued operations, or accounting changes (results not presented). Further, in contrast to Bartov (1993), the gain/loss amount scaled by beginning-of-year stock price is positively associated with the change in earnings per share excluding the PPE gain/loss deflated by the beginning-of-year stock price ($\Delta ADJEPS/PRICE$), but not associated with the firm's debt-to-equity ratio.

The results in Table 3 suggest that managers, on average, strategically report the lowest possible earnings benchmark to highlight the most favorable change in earnings, not to smooth the change in earnings. Table 4 shows that these inferences are stronger when the remind decision is conditioned on the current-period earnings realization.

Panel A of Table 4 classifies observations based on the sign of the change in total quarterly earnings (ΔEPS) and the change in adjusted quarterly earnings ($\Delta ADJEPS$). For the six gain-observations with $\Delta EPS < 0$ and $\Delta ADJEPS > 0$, reminding about the gain makes a negative earnings surprise based on total unadjusted earnings appear positive. Five of these six firms separately mention the prior-period gain. For the five loss-firms with $\Delta EPS > 0$ and $\Delta ADJEPS < 0$, reminding about the loss makes a positive earnings surprise based on total unadjusted earnings appear negative. None of these firms separately announces the prior-period loss. Thus, ten of the 11 firms strategically disclose the prior-period item either to preserve a positive earnings surprise or to avoid showing a negative surprise.[17] In this subsample of 11 observations, we do not find evidence of smoothing; however, the small sample size limits our ability to find significant differences in the frequency of reminder based on incentives.

Support for the conclusion that managers highlight the most favorable change in earnings also holds in the subsample of firms that will have a negative earnings surprise regardless of the prior-period earnings benchmark presented in the earnings announcement. For these firms, reminding about a prior-period gain and not reminding about a prior-period loss makes the total unadjusted change in earnings appear less negative. Of the 52 observations with $\Delta EPS < 0$ and $\Delta ADJEPS < 0$, no loss-observations remind, while 32 percent of the gain-observations (ten of 31) remind. The frequency of reminding is significantly higher for gain- than loss-observations in this subsample ($p < 0.01$). For firms that would have a positive surprise regardless of which prior-period earnings benchmark is presented ($\Delta EPS > 0$ and $\Delta ADJEPS > 0$), we are unable to reject independence between the sign of the nonrecurring item and the remind decision ($p > 0.10$).

While the results for the subsample in which strategic reminder avoids a negative earnings surprise ($n = 11$) clearly support the maximization objective, it is impossible to distinguish between the smoothing and maximization objectives for the remaining 117 observations. Within the subsample where $\Delta EPS > 0$ and $\Delta ADJEPS > 0$, announcing a loss or not separately announcing a gain is equivalent to smoothing the change in earnings. Similarly, in the subsample where $\Delta EPS < 0$ and $\Delta ADJEPS < 0$, the incentive to discuss the most favorable change in earnings by minimizing the prior-period earnings benchmark is perfectly confounded with the incentive to smooth this change in earnings. When we ignore the sign of $\Delta ADJEPS$ and ΔEPS and classify these 117 observations based only on

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[17] We do not provide a Chi-square statistic for this analysis due to the small sample size.

TABLE 4
Analysis of the Determinants of Firms' Decisions to Remind Conditional on the Earnings Realization[a]

	Strategic Reminder Avoids Negative Earnings Surprise		*Strategic Reminder Minimizes Negative Earnings Surprise*			*Strategic Reminder Maximizes Positive Earnings Surprise*		
	$\Delta EPS < 0$ and $\Delta ADJEPS > 0$	*$\Delta EPS > 0$ and $\Delta ADJEPS < 0$*	*$\Delta EPS < 0$ and $\Delta ADJEPS < 0$*			*$\Delta EPS > 0$ and $\Delta ADJEPS > 0$*		
REMIND	*PPE GAIN*	*PPE LOSS*	*PPE GAIN (Smoothers)*	*PPE LOSS (Nonsmoothers)*	*Total*	*PPE GAIN (Nonsmoothers)*	*PPE LOSS (Smoothers)*	*Total*
Yes	5	0	10	0	10	8	2	10
No	1	5	21	21	42	34	21	55
	6	5	31	21	52	42	23	65
				p-value[b] = 0.004			p-value[b] = 0.269	

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[a] This table presents univariate analysis of the determinants of firms' decisions to separately announce the prior-period components of earnings in the earnings announcement (REMIND) conditional on the earnings realization. The frequencies of remind decisions for observations classified according to the earnings realization and the sign of the nonrecurring prior-period item are provided.

[b] p-value of a Pearson χ^2 test of the homogeneity across classifications.

the incentives to smooth and the remind decision, the Chi-square statistic cannot reject independence ($p > 0.10$, results not reported). However, when we ignore the sign of ΔADJEPS and ΔEPS and classify these 117 observations based on the sign of the nonrecurring item (to test the maximization objective), there are significant differences in the frequency of reminder between gain- and loss-observations in this subsample ($p < 0.01$, results not reported). These results are consistent with the results in Table 3 that support the maximization objective for the full sample.[18]

Sensitivity Analysis

Signaling Persistence

Managers could separately mention a prior-period item, not for strategic reasons, but to signal the persistence of the gain/loss amount. This explanation would account for the results if gains are, on average, less persistent than losses and thus the gain-firms remind (loss-firms do not remind) in order to report the most appropriate benchmark for evaluating current earnings. However, for the sample firms, there is no evidence that the persistence of the gain/loss amount is related to the sign of the nonrecurring item.[19]

Ritualism

If managers are ritualistic in their disclosure decisions, the announcement decision at the remind quarter merely reflects the decision at the quarter of recognition (see Gibbins et al. 1990). We use the announcement decision at the quarter of recognition to represent firms' disclosure policies. We evaluate the remind decision conditional on the disclosure decision at the quarter of recognition to control for disclosure incentives other than the incentive to manage the perceived change in earnings.[20]

To control for firms' disclosure practices, we add a variable to equation (1) that indicates the disclosure decision at the quarter of recognition. The inferences from this logit model (not presented) are identical to those drawn from Table 3. The estimated coefficient on the indicator variable for the disclosure decision at the quarter of recognition is positive and statistically significant ($p < 0.01$), suggesting that disclosure decisions, on average, are consistent across time. However, the estimated coefficient on GAIN remains positive and statistically significant. Therefore, even after controlling for firms' general disclosure practices, we continue to find that managers strategically remind about a prior-period nonrecurring item to minimize the prior-period earnings benchmark and thus maximize the highlighted change in earnings.[21]

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[18] We also estimate equation (1) with an additional indicator variable that equals 1 for gain-observations that will have a negative surprise if they do not remind. The results indicate that both the sign of the nonrecurring item and the sign of the earnings surprise are significant determinants of remind decisions (results not reported).

[19] We regress total earnings from year t on earnings from continuing operations from year $t - 1$, earnings from noncontinuing operations from year $t - 1$, the gain/loss amount for year $t - 1$ (where $t - 1$ is the year of the PPE sale), and each independent variable interacted with an indicator variable for gain-observations (results not tabulated). For continuing earnings, noncontinuing earnings, and the gain/loss amount, the coefficients on each of these variables interacted with the indicator variable for the gain-observations are not significantly different from zero at conventional levels.

[20] Results (not presented) indicate that a firm's original disclosure decision in the earnings announcement for the quarter of recognition (in contrast to the decision to remind one year later) is related to the size of the nonrecurring item, not the sign. The relative frequency of informing about gains vs. losses is not significantly different based on a Chi-square test ($p = 0.238$, results not presented). Likewise, the logit estimation indicates that the sign of the nonrecurring item is not statistically significant, indicating that incentives to highlight the most favorable change in earnings do not drive disclosure decisions at the quarter of recognition.

[21] Differences in disclosure behavior at the quarter of recognition and the comparable quarter of the following year can also result from management turnover rather than strategic considerations. However, the mean number of management changes in officers and directors reported in the 10-Ks for the firms that change their disclosure strategies is not significantly higher than that for the firms with consistent disclosure patterns. Thus, management turnover does not explain our results.

V. INCENTIVES FOR STRATEGIC DISCLOSURE

In this section, we examine market reactions to the earnings announcements of the sample firms to determine if equity investors, one potential target of strategic reporting, unravel these disclosures. We also provide evidence on whether remind decisions vary cross-sectionally with factors other than the sign of the prior-period amount. The purpose of these tests is to investigate the source of strategic-reporting incentives. Given the noise inherent in market returns and our small sample size, these analyses should be viewed as preliminary explorations.

Market Reactions

To investigate if strategic reporting affects investors' perceptions of the change in earnings, we assume that investors use a seasonal random walk model to predict earnings and examine whether investors adjust their forecast of current-period earnings for the nonrecurring nature of the prior-period PPE gain/loss.[22] The estimated equation is:

$$\mathrm{CAR}^{EA}_{j,t} = \alpha_0 + \alpha_1 \mathrm{UE\_UNADJ}_{j,t} + \alpha_2 \mathrm{GL\_P}_{j,t} + \alpha_3 \mathrm{GL\_P}_{j,t} * \mathrm{REMIND}_{j,t} + \varepsilon_{j,t} \qquad (2)$$

where $\mathrm{CAR}^{EA}_{j,t}$ is the firm's size-adjusted return from CRSP accumulated from $t - 1$ to $t + 1$ around the earnings announcement date, UE_UNADJ is unexpected unadjusted earnings calculated as actual quarterly current-period earnings per share minus total earnings per share from the quarter of the PPE gain/loss, deflated by price, and GL_P is the per share gain/loss amount, deflated by price.[23]

Unexpected unadjusted earnings is overstated (understated) as a proxy for unexpected recurring earnings when the firm's earnings from the prior-period contain a nonrecurring loss (gain). Unexpected recurring earnings is UE_UNADJ plus (minus) the nonrecurring gain (loss) from the prior period. If investors adjust their expectations for the nonrecurring nature of the prior-period item, then GL_P will have a positive coefficient that is equal in magnitude to the estimated coefficient on UE_UNADJ. If investors do not adjust prior-period earnings for the nonrecurring nature of the PPE gain/loss, but rather use the unadjusted amount as their expectation of current-period earnings, then cumulative abnormal returns ($\mathrm{CAR}^{EA}_{j,t}$) will only be associated with unexpected unadjusted earnings (UE_UNADJ).

Equation (2) allows the estimated coefficient on GL_P to differ across remind and nonremind firms. If investors only adjust their expectations when reminded about the prior-period gain/loss, then the estimated coefficient on GL_P will be insignificant for nonremind firms ($\hat{\alpha}_2 = 0$) and significantly positive for remind firms ($\hat{\alpha}_2 + \hat{\alpha}_3 > 0$).

The coefficient estimates presented in Table 5 are weighted least squares estimates where outliers identified based on studentized residuals are downweighted according to the method of Welsch (1980). The results are similar when we do not employ this downweighting procedure, or when we eliminate observations identified as outliers based on studentized residuals or Cook's D.

The regression results in Table 5, Panel A, suggest that the market does not unravel managers' strategic disclosure decisions at the time of the earnings announcement. Excess

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[22] We cannot use analyst forecasts as a proxy for expected earnings since analyst forecasts are available from either Zacks Investment Research or I/B/E/S for only 52 sample observations. However, indirect evidence suggests that the results are robust to the amount of information available for forming earnings expectations, as measured by analyst following or by firm size (see Atiase 1985). Even after controlling for firm size or analyst following (when available), the estimated coefficient on GL_P is insignificant for the nonremind observations (results not reported).

[23] The results presented hold if we use cumulative abnormal returns from a market model estimated for each firm from $t - 220$ to $t - 21$ using the value-weighted market index.

TABLE 5
Market Reactions to Strategic Remind Decisions at the Earnings Announcement and Financial Statement Release Dates[a]

Panel A: Market Reactions at the Earnings Announcement Date

Equation (2):[b] $CAR^{EA}_{j,t} = \alpha_0 + \alpha_1 UE\_UNADJ_{j,t} + \alpha_2 GL\_P_{j,t} + \alpha_3 GL\_P_{j,t} * REMIND_{j,t} + \varepsilon_{j,t}$

Intercept	*UE_UNADJ*	*GL_P*	*GL_P* REMIND*	*F-Statistic*[c]	*n*	*Adj. R^2*
0.0116	0.4140	−0.1993	1.0579	3.0193	112[d]	8.82%
(0.118)	(0.004)	(0.731)	(0.169)	(0.085)		(0.005)

Panel B: Market Reactions at the Financial Statement Release Date

Equation (3):[b] $CAR^{FS}_{j,t} = \gamma_0 + \gamma_1 GL\_P_{j,t} + \gamma_2 GL\_P_{j,t} * REMIND_{j,t} + \xi_{j,t}$

Intercept	*GL_P*	*GL_P* REMIND*	*F-Statistic*[c]	*n*	*Adj. R^2*
0.0066	0.7176	−0.0793	2.1707	107[e]	2.88%
(0.249)	(0.087)	(0.895)	(0.144)		(0.081)

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[a] The coefficient estimates are weighted least squares estimates where leveraged outliers have been downweighted according to the method of Welsch (1980). p-values are in parentheses.

[b] Variable definitions:

$CAR^{EA}_{j,t}$ = firm j's cumulative size-adjusted return over days −1 to +1 around the earnings announcement date.

$UE\_UNADJ_{j,t}$ = firm j's actual earnings per share from quarter q minus actual earnings per share from quarter q − 4 deflated by price, where quarter q − 4 is the quarter of the PPE gain/loss recognition.

$GL\_P_{j,t}$ = firm j's per-share gain/loss amount deflated by price.

$REMIND_{j,t}$ = an indicator variable which equals 1 if firm j separately reports the prior-period gain/loss amount, 0 otherwise.

$CAR^{FS}_{j,t}$ = firm j's cumulative size-adjusted return over days −1 to +1 around the financial statement release date.

[c] The F-statistic tests the hypothesis that GL_P + GL_P*REMIND equals zero.

[d] Fourteen observations (three remind, 11 nonremind) have financial statement release dates prior to the earnings announcement date and are excluded from this analysis. Four observations (two remind, two nonremind) are missing $CAR^{EA}_{j,t}$.

[e] Fourteen observations (three remind, 11 nonremind) have financial statement release dates prior to the earnings announcement date and are excluded from this analysis. Eight observations (four remind, four nonremind) are missing financial statement release dates, and one remind observation is missing $CAR^{FS}_{j,t}$.

returns around the earnings announcement date are not associated with the prior-period gain/loss for the sample of nonremind observations as evidenced by the insignificant coefficient on GL_P (p-value = 0.731). This result indicates that investors in nonremind firms do not, on average, adjust their expectations to reflect the difference between the persistence of the prior-period gain/loss and current-period earnings.

In contrast, announcement-date returns are associated with unexpected earnings that have been adjusted for the prior-period gain/loss amount for the observations that remind. Although the estimated coefficient on GL_P*REMIND is insignificant (p-value = 0.169), the sum of the coefficients on GL_P and GL_P*REMIND is significantly positive (p-value

= 0.085). Joint significance of the coefficient estimates in the presence of insignificant individual coefficient estimates is not uncommon and is likely due to collinearity (Greene 1990, 195, 279); the Pearson correlation between GL_P and GL_P*REMIND is 0.920. When we eliminate six influential observations identified based on studentized residuals greater than 2 in absolute value or Cook's D greater than 1, the Pearson correlation between GL_P and GL_P*REMIND drops to 0.683. We re-estimate equation (2) without these six observations and the estimated coefficient on GL_P remains insignificant (−0.3427, p-value = 0.461) while the estimated coefficient on GL_P*REMIND is significantly positive (1.6909, p-value = 0.014). Consistent with the results in Panel A of Table 5, the sum of the coefficient estimates on GL_P and GL_P*REMIND remains significantly positive (F-statistic = 7.441, p-value = 0.008) in this reduced sample.

Further, in the full sample (Panel A, Table 5), the estimated coefficient on the gain/loss amount for the remind firms (−0.1993 + 1.0579 = 0.8586) is not significantly different from the coefficient on unexpected unadjusted earnings (0.4140, p-value = 0.405). As a robustness check, we allow the estimated intercept and coefficient on UE_UNADJ to vary across remind and nonremind observations. The estimated coefficient on GL_P remains insignificant for nonremind observations (p-value = 0.699) and significantly positive for remind observations (p-value = 0.038). These findings suggest that investors adjust their expectations for the full amount of the prior-period gain/loss when reacting to current-period earnings if they are reminded about it.

The result that investors do not adjust for the nonrecurring nature of the gain/loss amount at the earnings announcement date does not necessarily indicate market inefficiency. An alternative explanation is that it is costly for investors to remember or to collect information on prior-period PPE gains/losses for individual firms in their portfolios. Ignoring these items for individual firms does not lead to mispricing in the aggregate if the investor makes an unbiased estimate of the average persistence of PPE gains/losses across all firms. Camerer (1987) provides a similar argument, among others, to explain empirical evidence that documents instances of investor behavior that are labeled "irrational." If this portfolio approach explains the results for the market reaction at the earnings announcement date, then we expect price adjustments for the nonremind firms subsequent to the earnings announcement date when the market realizes the actual persistence of prior-period earnings for an individual firm. We investigate whether this adjustment occurs at the release of the 10-K (for fourth quarter observations) or the 10-Q (for first, second, and third quarter observations). For the firms that do not separately announce the prior-period gain/loss in their quarterly earnings announcements, the financial statement release date is the first time that investors are reminded about it. The estimated equation is:

$$CAR^{FS}_{j,t} = \gamma_0 + \gamma_1 GL\_P_{j,t} + \gamma_2 GL\_P_{j,t} * REMIND_{j,t} + \xi_{j,t} \quad (3)$$

where $CAR^{FS}_{j,t}$ is the size-adjusted return from one day before to one day after the financial statement release date. The reported coefficients are weighted least squares estimates where outliers have been downweighted according to the method of Welsch (1980).

Excess returns are positively associated with the gain/loss amount at the financial statement release date only for firms that did not remind at the earnings announcement date (Table 5, Panel B). The estimated coefficient on GL_P for the nonremind observations of 0.7176 is statistically positive (p-value = 0.087). This finding is consistent with investors' realizing at the financial statement date that they did not fully adjust for the nonrecurring nature of the prior-period gain/loss at the earnings announcement date. By contrast, there is no association between the GL_P and size-adjusted returns for the remind firms. The sum of $\hat{\gamma}_1$ and $\hat{\gamma}_2$ of 0.6383 (0.7176 − 0.0793) is not statistically different from zero (p-value = 0.144) and remains insignificant when we eliminate influential observations. This insignificant relation is consistent with our conclusion from Panel A that investors appropriately adjusted the earnings benchmark for the remind observations when earnings were announced. Allowing the intercept to vary across remind and nonremind observations does not change these inferences; the estimated coefficient on GL_P remains positive for the subsample of nonremind observations (p-value = 0.090) and insignificant for the subsample of remind observations (p-value = 0.848).

Although the results in Table 5 suggest that managers may be able to affect investors' perceptions of unexpected earnings until the financial statement release date by strategically reminding at the earnings announcement date, the small sample size limits the power of our tests and also limits our ability to effectively control for other possible explanations. For example, managers could use discretion to provide private information about the persistence of future earnings, and investors view this disclosure as credible. However, there is no significant difference between the persistence of the gain/loss amount for the samples of reminders and nonreminders.[24] Another explanation is that the financial statements contain other new information besides the components of prior-period earnings. We reduce the probability that information other than the financial statements is released during the return accumulation period by testing for a price correction in the short window around the financial statement release date. This short-window approach, however, ignores the possibility that adjustments for over-weighting the prior-period nonrecurring amount can occur between the earnings announcement date and financial statement release date. This explanation may account for the lack of an association between the gain/loss amount and the excess returns at the financial statement release date in the remind subsample.

Cross-Sectional Incentives for Strategic Disclosure

Given the focus on equity investors as the target of strategic reporting, the likelihood that a firm strategically chooses a prior-period earnings benchmark should vary cross-sectionally with the expected benefits of (temporary) over- or underpricing. First, we examine the involvement of the firm and its managers in capital market transactions subsequent to the earnings announcement date. We also investigate if the strategic reporting decisions vary with the firm's level of investor sophistication because managers have greater incentives to strategically adjust the benchmark if they believe it is more likely that they can affect the firm's stock price. Finally, managers' incentives to affect equity price through strategic disclosure should vary cross-sectionally with disclosure-related costs.

We do not find evidence that the decision to remind for the sample firms is associated with any of these incentives. One explanation for these results is that there are minimal costs related to selectively disclosing the components of prior-period earnings. If the reporting decision is costless, managers have incentives to report strategically, even if *ex post* they do not take advantage of the temporary mispricing. There are no proprietary costs associated with disclosing this component of earnings, assuming competitors are rational. Also, unlike earnings manipulations, the disclosure decision does not create costs related to future reversals of current-period earnings manipulations. An alternative explanation for the lack of cross-sectional variation is that the variables examined relate only to the benefits and costs of targeting equity investors. Managers may report strategically to influence the perceptions of other parties. Finally, the small sample size limits our ability to detect significant cross-sectional differences in disclosure strategies. Because we do not identify any significant differences in incentives, we provide only a brief description of the procedures.

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[24] We regress earnings from quarter q on continuing earnings from quarter q − 4, noncontinuing earnings from quarter q − 4, and the gain/loss amount (GL) from quarter q − 4 (results not reported). The estimated coefficient on the gain/loss amount is not statistically different between firms that remind and firms that do not remind.

Thirteen sample firms have at least one equity or debt issue in the year following the earnings announcement.[25] These issues are not associated with strategic disclosures ($\chi^2 = 1.245$, $p > 0.10$). In addition, the magnitudes of the issues, measured relative to the market value of common stock outstanding, are not statistically different for the strategic and nonstrategic firms ($t = -0.546$, $p > 0.10$). The first issue of equity or debt for the 13 firms occurred, on average, 191 calendar days after the earnings announcement. Therefore, the lack of association within the sample is not surprising because the results in Table 5 indicate that investors adjust for placing too much weight on the nonrecurring item at the financial statement release date. Focusing only on the sample of gain-observations, in which there is more cross-sectional variation in the remind decision, does not change these conclusions.

There also is no association between strategic choice of a benchmark and capital market transactions involving insiders. Managers can benefit personally from strategic announcements by purchasing (selling) shares when the firm is temporarily undervalued (overvalued). However, loss-observation managers who sell shares subsequent to the earnings announcement are not more likely to have reminded, and gain-observation managers who buy shares subsequent to the earnings announcement are not more likely to have reminded. Data on the number of shares purchased and sold by officers and directors are from the *Official Summary of Security Transactions and Holdings* for the three months prior and the six months after the end of the remind quarter. The results do not show any association between strategic disclosure and either the number or market values of shares traded.[26]

There is no association between strategic disclosure in the earnings announcement and two proxies for the level of investor sophistication: institutional ownership and analyst following (Hand 1990; O'Brien and Bhushan 1990). Institutional ownership equals the percentage of total outstanding shares owned by institutional investors at the beginning of the month in which the earnings announcements is made, calculated using data from the *Standard & Poor's Stock Guide*. Analyst following equals the number of analysts that issue forecasts of earnings for the quarter based on the I/B/E/S and Zacks Investment Research databases. Institutional ownership and analyst following data are available for 104 and 70 of our sample observations, respectively. The average percentage of institutional ownership for firms that strategically remind about the prior-period gain/loss (26.13 percent) is not significantly lower than that of firms that do not strategically remind (29.42 percent) in the year following the PPE sale ($t = 0.812$, $p > 0.10$). Similarly, the average analyst following for firms that strategically remind (6.26) is not significantly lower than that of firms that are not strategic (6.54; $t = 0.156$, $p > 0.10$). Including either the level or presence of institutional ownership or analyst following in the logit regression does not alter the significant association between the sign of the nonrecurring item and the decision to remind. Further, the results hold if we examine differences in analyst following and institutional ownership within the sample of gain-observations. This finding that the availability of information does not affect a manager's decision to remind about a prior-period nonrecurring PPE gain/loss is consistent with the inference that the information environment does not affect the market's reaction to the sample firms' earnings announcements.

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[25] These data are obtained from Securities Data Company's Corporate New Issues database.

[26] Restrictions on insider trading may account for these results. Although no specific regulation prohibits insider trading around earnings announcements, the SEC prohibits trading on material undisclosed information, in general, until this information is made public. Firms also often place restrictions on insider trading.

Finally, we test for cross-sectional variation in the disclosure decisions as a function of potential litigation costs, which we claim are the most significant disclosure-related costs. Assuming courts are rational, there will be no settlement costs associated with not disclosing the components of earnings since the information was publicly available. However, defending "nuisance" suits is costly even if a favorable outcome is certain. We use the *Security Class Action Alert Newsletter* issues between April 1988 and September 1995 to identify subjects of disclosure-related lawsuits.[27] Although Skinner (1997) shows that past litigation can encourage future disclosure integrity, none of the three firms that were subject to 10b-5 suits prior to the remind-year earnings announcement date reminds. Likewise, there is no evidence that managers who make strategic disclosure decisions are more likely to subsequently face 10b-5 suits, consistent with Francis et al.'s (1994) finding that the tone of disclosures made by firms that are subsequent targets of litigation is not more optimistic than the tone of disclosures made by their sample of control firms. Five firms are the subject of subsequent litigation, but these firms are not more strategic prior to the litigation than the average firm in the sample.[28]

VI. CONCLUSION

This paper shows that managers strategically lower the prior-period earnings benchmark against which current-period earnings are compared in earnings announcements through their decisions to separately report the components of prior-period earnings. This strategy allows managers to discuss the most favorable change in net income over the comparable quarter of the prior year. Managers of firms that incur prior-period losses on the sale of PPE are less likely than managers with gains to remind about this nonrecurring component of prior-period earnings. The likelihood that managers will strategically remind is stronger if doing so prevents showing a negative earnings surprise.

An analysis of excess returns at the earnings announcement date suggests investors use the benchmark provided by managers to evaluate current-period earnings, even if this benchmark is not appropriate to evaluate unexpected recurring earnings. These results imply that the perceptions of equity investors, one potential target of strategic disclosure, are affected by managers' strategic-reporting decisions at the earnings announcement date. However, there is no evidence that cross-sectional variation in the announcement decisions is related to proxies for the benefits of strategic disclosure that would accrue to managers by influencing equity investor perceptions. The inferences from the market reaction analysis and the cross-sectional tests of reporting incentives are constrained by the small sample that was chosen to maximize the power of the disclosure tests. Given the tentative nature of these conclusions, further research on investors' interpretations of earnings announcements and the related incentives for firms' disclosure practices will be useful for assessing the generalizability of these results.

The selective inclusion of information that is already available in a public disclosure has not been considered in the theoretical discretionary disclosure literature. Disclosure models focus on the release of private information and predict full disclosure unless there are disclosure-related costs (e.g., Grossman 1981; Milgrom 1981; Verrecchia 1983; Dye 1985; Darrough and Stoughton 1990; Gigler 1994). In these papers, it is common knowledge that both the discloser and the information recipient are rational in the sense that they appropriately revise their beliefs when presented with new information. Our analysis, by contrast, allows the manager (the discloser) to believe that some investors (the recipients) are "irrational" in the sense that they forget publicly available information that will affect their reactions to earnings announcements if not reminded about it. In our setting, even if there are minimal disclosure-related costs, managers have incentives to strategically choose an earnings benchmark.

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[27] See Francis et al. (1994) for a thorough description of this source.

[28] We also consider the Financial Analyst Federation's ratings of firms' disclosures (Lang and Lundholm 1993; Healy et al. 1999) as another measure of disclosure integrity. Unfortunately, these data are available for only seven of our sample firms, thus making any statistical analysis infeasible.

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Effects of Comprehensive-Income Characteristics on Nonprofessional Investors' Judgments: The Role of Financial-Statement Presentation Format

Laureen A. Maines
Indiana University
Linda S. McDaniel
University of North Carolina at Chapel Hill

ABSTRACT: Statement of Financial Accounting Standards (SFAS) No. 130 requires companies to report comprehensive income in a primary financial statement, but allows its presentation in either a statement of comprehensive income or a statement of stockholders' equity (Financial Accounting Standards Board [FASB] 1997). In an experiment, we examine whether and how alternative presentation formats affect nonprofessional investors' processing of comprehensive-income information, specifically, information disclosing the volatility of unrealized gains on available-for-sale marketable securities. The results show that nonprofessional investors' judgments of corporate and management performance reflect the volatility of comprehensive income only when it is presented in a statement of comprehensive income. We provide evidence consistent with our psychology-based framework that these findings occur because format affects how nonprofessional investors weight comprehensive-income information and not whether they acquire this information or how they evaluate it.

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I. INTRODUCTION

This paper reports results of an experiment that examines effects on nonprofessional investors' performance judgments of the FASB's decision to allow presentation of comprehensive income in either a statement of comprehensive income or a statement of stockholders' equity (FASB 1997, para. 65). Comprehensive income includes net income and other transactions with nonowners that affect stockholders' equity, but are excluded from net income. Some of these other comprehensive-income items are related to core-business activities and are relevant for making judgments of firm performance and valuation, for example, unrealized gains and losses on investment portfolios held by financial institutions, such as insurance companies.[1]

The FASB's decision to allow alternative financial-statement formats in SFAS No. 130 represents a compromise between its initial exposure draft position and the viewpoint of corporate management. The FASB originally proposed that companies report comprehensive income in a performance statement, such as a statement of comprehensive income, reflecting the belief that other comprehensive-income items can be as relevant as net income in measuring firm performance (FASB 1997, 10). Board members further indicated that presentation of comprehensive income in a performance statement would enhance its visibility, thereby increasing investors' use of this information (FASB 1997, 10). Corporate managers argued against such presentation, disagreeing with the implication that *all* comprehensive-income items are performance-related (FASB 1997, para. 60). Consequently, managers proposed that comprehensive income would be more appropriately presented in the statement of stockholders' equity. The FASB responded to this opposition by allowing companies to present comprehensive income in either statement, but indicated plans to revisit the format issue in the future (FASB 1997, para. 74).

This study provides evidence on one key issue in the format debate: whether nonprofessional investors' use of comprehensive-income information depends on the financial statement in which it is reported. Specifically, we examine whether the two allowable SFAS No. 130 statements differentially affect the degree to which nonprofessional investors incorporate comprehensive-income information that is related to core-business activities in their judgments of corporate and management performance. We focus on nonprofessional investors because standard setters have expressed an explicit interest in understanding how financial-reporting standards affect this investor group (Levitt 1997, 4). Additionally, corporate managers specifically stated in comment letters to the FASB that nonprofessional investors, due to their limited understanding of financial information, would be more influenced by the presentation format of comprehensive income than would be professional analysts.

We develop a psychology-based framework that evaluates how presentation format affects nonprofessional investors' information acquisition, evaluation, and weighting processes. Based on prior research in accounting and psychology, we predict that format will affect only how nonprofessional investors *weight* comprehensive income, and we identify five differences between format presentations that help predict which format will produce the greatest weighting of this information.

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[1] As noted by the Special Committee on Financial Reporting (AICPA 1994, 81), there is no consensus on the specific definition of core- vs. noncore-business activities. We use the term "core activities" to represent significant operating activities and the term "noncore activities" to represent peripheral operating and nonoperating activities.

Ninety-five evening M.B.A. students participated in an experiment to test these predictions. Participants analyzed an insurance company's financial statements which presented unrealized gains on investments in either a SFAS No. 130 statement of comprehensive income format or one of two statements of stockholders' equity formats, the first based on SFAS No. 130 and the second based on the prior standard (SFAS No. 115, *Accounting for Certain Investments in Debt and Equity Securities* [FASB 1993]). Additionally, for each financial-statement format, there were two versions of the comprehensive-income information in which unrealized gains reflected either high or low volatility. The resulting 3 (format) × 2 (volatility) between-subjects design facilitates an evaluation of whether investors' judgments differ between the SFAS No. 130 and SFAS No. 115 presentations, as well as between the two SFAS No. 130 formats.

Our results show that participants read (i.e., acquire) unrealized-gain information and appropriately evaluate the volatility of unrealized gains in all three formats, with no significant differences between formats in acquisition or evaluation. In contrast to these results for acquisition and evaluation, we generally find that participants place significant *weight* on their volatility assessments when unrealized gains appear in SFAS No. 130's statement of comprehensive income, but not when they appear in either the SFAS No. 130 or the SFAS No. 115 statements of stockholders' equity. Correspondingly, these individuals typically judge corporate and management performance for the low-volatility version of the company to be better than that for the high-volatility version only when unrealized gains appear in the statement of comprehensive income.

Overall, our results suggest that nonprofessional investors rely on the financial statements to provide signals about the nature and importance of comprehensive-income information. These findings indicate that only one of the allowable SFAS No. 130 formats, the statement of comprehensive income, provides additional benefits beyond those of SFAS No. 115 for nonprofessional investors' incorporation of comprehensive-income information in their performance judgments. Thus, this study suggests that the FASB's decision to allow companies a choice between financial-statement formats will not necessarily achieve the exposure draft's original objectives of enhanced visibility and increased use of comprehensive-income information for a significant group of financial-statement users.

Our results complement those of Hirst and Hopkins (1998). They show that professional investors (analysts) often fail to acquire unrealized gain and loss information for the marketable securities of an electronics manufacturing firm when this information is presented in a statement of stockholders' equity, but that analysts do acquire and use this information when it is presented in a statement of comprehensive income. While these findings demonstrate that format affects analysts' judgments, the underlying mechanism (acquisition) differs from that found in our study (weighting). This difference may be due to the fact that unrealized gains and losses typically are of low frequency and small magnitude for manufacturing firms, but are of high frequency and large magnitude for financial-services firms (Dhaliwal et al. 1999). As a consequence, professional investors may tend not to acquire this information when valuing a manufacturing firm like that used by Hirst and Hopkins (1998), but may acquire and evaluate this information when valuing a financial-services firm, consistent with the results of prior archival research (Petroni and Wahlen 1995). This is only one conjecture about the differences between our results and those of Hirst and Hopkins (1998); testing this explanation would require systematically examining professional and nonprofessional investors' judgments in both manufacturing and financial-services contexts. We further discuss this and other directions for future research in the "Discussion and Conclusions" section.

Section II of the paper discusses background information on the reporting of comprehensive income. Section III presents our framework and develops hypotheses. The experimental method is described in Section IV and results appear in Section V. Section VI concludes the paper by discussing our findings along with results of other studies within the context of our framework.

II. REPORTING COMPREHENSIVE INCOME

Comprehensive income is net income plus other comprehensive-income items, such as unrealized gains and losses (UGL) on investments, net losses related to an additional pension liability, and foreign currency translation adjustments (FASB 1997). For many companies, including those in financial services, UGL are the most important and volatile component of comprehensive income (Barth et al. 1995). Prior to SFAS No. 130, companies recognized other comprehensive-income items as a component of stockholders' equity, with the specific reporting for these items governed by individual accounting standards (for example, SFAS No. 115 on marketable securities). Smith and Reither (1996) report that some companies obscured other comprehensive-income items by combining them with each other or with other stockholders' equity categories, such as paid-in capital. In response to these reporting practices, analysts called for greater visibility and disaggregation of these items to facilitate financial analysis (Association for Investment Management and Research [AIMR] 1993, 63).

In June 1996, the FASB issued an exposure draft, *Reporting Comprehensive Income*, that proposed companies present comprehensive income in a performance statement, under the premise that this statement would increase the visibility of other comprehensive-income items and give equal prominence to net income and total comprehensive income (FASB 1996, paras. 50 and 63). Comment letters reflected opposition to the exposure draft, alleging that it would provide neither new information for professional investors nor useful information for nonprofessional investors.[2] Preparers indicated that analysts could already extract information on the components of comprehensive income from pre-SFAS No. 130 financial statements and footnotes if they considered this information relevant for assessing corporate performance. They also argued that nonprofessional investors would be confused about when it is appropriate to use total comprehensive income or net income in assessing firm performance (FASB 1997, para. 60).

Financial-services companies expressed a particular concern that reporting UGL in a performance statement would influence nonprofessional investors' reactions to UGL volatility. Many companies maintained that UGL are not relevant for evaluating corporate performance, and that nonprofessional investors would view UGL as performance-related if presented in a statement of comprehensive income (cf. comment letters from Grafton State Bank and America's Community Bankers). Even preparers who conceded that UGL are related to *corporate* performance argued that they are an inappropriate measure of *management* performance. They based this argument on the fact that factors beyond managers' control, such as interest rate fluctuations, affect UGL volatility (cf. comment letters from First Tennessee National Bank and Independent Bankers Association of America).[3]

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[2] Our analysis of the 281 comment letters received by the FASB indicated that 90 percent opposed and 6 percent favored the position of the exposure draft. The remaining 4 percent were neutral. Financial-services firms wrote 35 percent of the comment letters, indicating the importance of the proposed standard to this industry.

In 1997, the FASB issued SFAS No. 130 requiring companies to report comprehensive income in a primary financial statement, but allowing its presentation in either a performance or nonperformance statement (FASB 1997, para. 14). Specifically, under SFAS No. 130 firms can choose either a statement of comprehensive income (denoted 130IS, with IS signifying an income statement format) or a statement of stockholders' equity (denoted 130EQ). Regardless of which statement a company chooses, it must classify comprehensive-income items by their nature and show gross changes in these items. The Appendix provides examples, taken from our experimental materials, of the two SFAS No. 130 statements as well as an example of the net-change statement of stockholders' equity (denoted 115EQ) required previously under SFAS No. 115 (FASB 1993).

III. IMPLICATIONS OF PRESENTATION FORMAT FOR NONPROFESSIONAL INVESTORS' JUDGMENTS

In this section, we present a framework for evaluating how the format for presenting comprehensive income affects investors' judgments of corporate and management performance. The framework proposes that presentation format influences investors' information processing and resulting judgments by affecting the acquisition, evaluation, and/or weighting of comprehensive-income information (Hogarth 1987). As indicated in Figure 1, the framework models performance-assessment judgments (PAJ) as a weighted linear combination of cues, $PAJ = \alpha + \Sigma\beta_j E(I_j) + \varepsilon$ (Dawes 1974). Cues $E(I_j)$ are an individual's evaluation of specific financial-statement information (I_j) and are outputs of the information acquisition and evaluation processes. In the context of this study, information "acquisition" refers to an investor reading a specific financial-statement item (i.e., UGL information) and storing the item in memory sufficiently well to recall where it appeared in the financial statements. Information "evaluation" involves an investor assessing characteristics of the data, such as UGL volatility. The weight an investor places on the evaluated information characteristic (β_j) reflects, in part, his perceived importance of that characteristic for judging corporate and management performance. Figure 1 shows that information weighting depends on information acquisition and evaluation.

Acquisition and Evaluation of UGL Information

Our framework indicates that different financial-statement formats can influence whether investors read comprehensive-income information. Hirst and Hopkins (1998) provide evidence on professional investors. They demonstrate that analysts detect earnings management related to investments in an electronics company only when UGL are presented in a statement of comprehensive income. In that study, half of the analysts receiving the statement of stockholders' equity did not even recall seeing the term "comprehensive income," suggesting that they did not acquire the UGL information.[4] Thus, presentation

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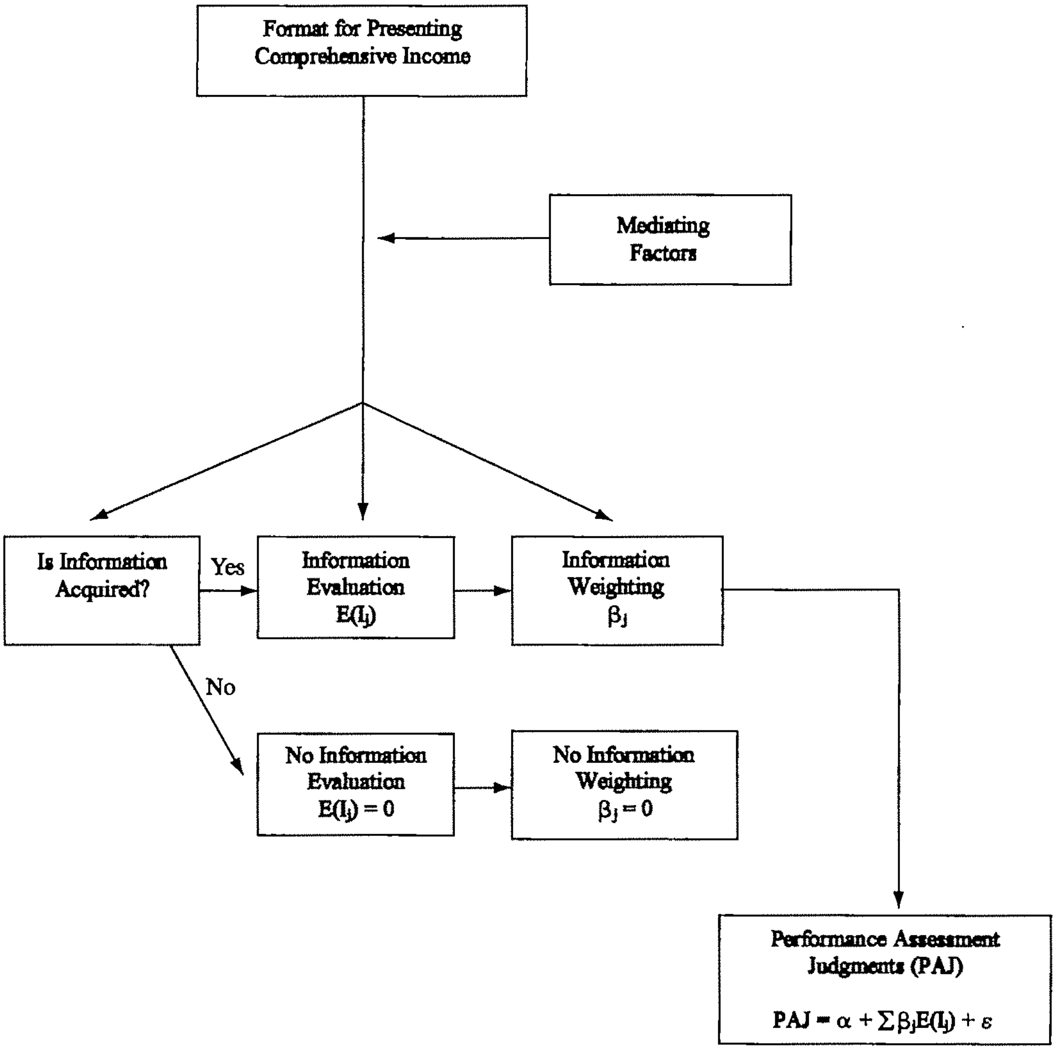
[3] The validity of these arguments is questionable. For financial-services companies, managing investments is a core-business activity. Additionally, other core activities have factors not completely controllable by management (e.g., natural disasters for insurance companies), and yet managing these risks is part of managers' responsibilities. Finally, firms can use relative performance evaluation measures to eliminate effects of uncontrollable factors (Antle and Smith 1986).

[4] Additionally, it is possible for analysts to see the term "comprehensive income" and yet not read about the components of comprehensive income (e.g., UGL information). Because Hirst and Hopkins (1998) did not ask a manipulation check question specifically about the acquisition of UGL information, it is not clear whether analysts who indicated that they saw the term "comprehensive income" actually read UGL information.

FIGURE 1
Framework for the Effects of Comprehensive-Income Presentation Format on Investors' Performance Assessment Judgments


Format for Presenting Comprehensive Income
Mediating Factors
Is Information Acquired?
Yes
No
Information Evaluation $E(I_j)$
Information Weighting β_j
No Information Evaluation $E(I_j) = 0$
No Information Weighting $\beta_j = 0$
Performance Assessment Judgments (PAJ)
$PAJ = \alpha + \Sigma\beta_jE(I_j) + \varepsilon$

format appears to affect these analysts' judgments partly because of a failure to acquire information.

Research indicates that analysts and nonprofessional investors acquire financial information differently, suggesting that Hirst and Hopkins' (1998) results may not generalize to nonprofessional investors. Analysts develop valuation models and acquire information relevant for these models using a directed-search strategy. This approach leads them to skip back and forth among information in the financial statements (Bouwman et al. 1987; Hunton and McEwen 1997). As such, analysts are unlikely to read particular financial statements or specific information within those statements if it is not relevant to their models. In Hirst and Hopkins' (1998) experiment, analysts may have ignored the statement of stockholders' equity because they view this statement as relatively unimportant for valuation (Brown 1997), in contrast to the importance placed on performance statements (SRI International 1987, 54). Additionally, these analysts may not have searched for UGL information because, as noted by Hirst and Hopkins (1998, 59) and documented by Dhaliwal et al. (1999), UGL are likely to be smaller and therefore less important for the valuation of manufacturing firms than financial-services firms.[5]

In comparison to analysts, nonprofessional investors generally have ill-defined valuation models, fail to identify specific data needed for financial analysis, and assimilate information in a relatively unstructured manner (SRI International 1987, 26, 29, 54). Process-tracing research shows that nonprofessional investors (and less-experienced analysts) read the financial statements in the order presented, suggesting they have few preconceived ideas of the importance of and/or relations among various financial statement items (Bouwman 1982; Hunton and McEwen 1997). Given this sequential information processing, nonprofessional investors are likely to read UGL information regardless of its location. Having read the UGL information, they will also perceive visible characteristics, such as the volatility of UGL. Thus, we predict that nonprofessional investors will both acquire UGL information and correctly evaluate its volatility, regardless of format.[6] That is, whether UGL information is presented in a statement of comprehensive income (130IS), or in the SFAS No. 130 (130EQ) or SFAS No. 115 (115EQ) statements of stockholders' equity, we expect no differences in nonprofessional investors' information acquisition (H1) or evaluation (H2).

H1 (Acquisition): Nonprofessional investors will acquire information on UGL in all three financial-statement formats for presenting comprehensive income.

H2 (Evaluation): Nonprofessional investors will correctly evaluate UGL volatility (high vs. low) in all three financial-statement formats for presenting comprehensive income.

Weighting of UGL Volatility in Performance-Assessment Judgments

While we expect nonprofessional investors to acquire and evaluate UGL information similarly in all three formats, we predict that presentation format will differentially affect the weighting they place on the information. Consequently, any differences in these investors' performance judgments will arise from differences in their information weighting. These differences in weighting are attributed to nonprofessional investors' limited understanding of financial analysis (SRI International 1987, 29), which leads them to infer the importance of comprehensive income from the way it is presented.

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[5] For the 1,142 firm-year observations of UGL in the top decile of their sample, Dhaliwal et al. (1999) find that 88 percent are associated with financial-services firms. Also, for their entire sample of 11,425 firm-year observations, other comprehensive-income items are larger for financial institutions than for other industries, representing on average 4.3 percent of market value for financial institutions compared to 0.5 percent of market value for all other industries combined. Additionally, to assess the importance of investments to electronics companies, we examined *Standard & Poor's Industry Survey* for the electronics industry for several years in the mid-1990s and saw no mention of investments (Standard & Poor's 1995). In contrast, the survey on the insurance industry discussed both realized and unrealized gains and losses on investments.

[6] There are some cases in which financial-statement format might differentially affect acquisition or evaluation of comprehensive-income items. For example, if a comprehensive-income characteristic is not visibly displayed in the format, nonprofessional investors might fail to notice that characteristic. In our experiment, UGL volatility (the characteristic of interest) was apparent even in the 115EQ net-change format.

Although the debate over SFAS No. 130 involved only the performance vs. nonperformance aspect of financial-statement formats, we propose that there are several dimensions of these formats that can influence nonprofessional investors' information weighting. We use research in accounting and cognitive psychology to identify five relevant dimensions of comprehensive-income formats, which we then classify into two categories (performance signals and cognitive costs).[7] For each dimension, we determine whether the format will positively or negatively affect the weights that investors place on UGL information when judging corporate and management performance. The dimensions and their implications for information weighting appear in Table 1.

Dimensions Related to Performance Signals

Prior research demonstrates that certain features of information presentation can influence how individuals classify information (e.g., UGL information), and thereby affect their perceptions of its importance for judgments. For example, Hopkins (1996) documents that placement of a financial instrument in the liability vs. stockholders' equity section of the balance sheet affects the impact of the financial instrument on analysts' stock values. Similarly, Kozminsky (1977) demonstrates that labels influence how individuals classify

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[7] Lipe (1998a) recognized two of our five dimensions, placement and information aggregation, in her discussion of Hirst and Hopkins (1998).

TABLE 1
Effects of Presentation Format Dimensions on Weighting of Comprehensive-Income Characteristics

	Format for Presenting Comprehensive Income[a]		
Format Dimension	*115EQ*	*130EQ*	*130IS*
Performance Signals Category[b]			
Placement in Financial Statements	Negative[c]	Negative	Positive
Labeling of Comprehensive Income	Negative	Positive	Positive
Linkage to Net Income	Negative	Positive	Positive
Cognitive-Costs Category[d]			
Isolation	Negative	Negative	Positive
Aggregation	Negative	Positive	Positive

[a] The 115EQ format presents net changes in comprehensive-income components (i.e., UGL) in the statement of changes in stockholders' equity, as was required under SFAS No. 115. The 130EQ and 130IS formats represent two alternative presentations under SFAS No. 130, with 130EQ presenting gross changes in UGL in a statement of changes in stockholders' equity and 130IS presenting gross changes in UGL in a statement of comprehensive income.

[b] The *placement* dimension refers to whether comprehensive-income items are presented in a performance or nonperformance statement. The *labeling* dimension refers to whether comprehensive-income components are explicitly labeled as income. The *linkage* dimension refers to whether other comprehensive-income items are directly linked to net income in the financial statement.

[c] For each format/dimension combination, "positive" and "negative" refer to the effects of format on nonprofessional investors' weighting of other comprehensive-income items and their resulting performance assessment judgments.

[d] The *isolation* dimension refers to whether comprehensive income is the only information in the statement or whether other information categories appear in the statement. The *aggregation* dimension refers to whether the gross changes in comprehensive income are displayed in the statement, or only the net change is shown.

information. Finally, Lipe and Salterio (1999) provide evidence that direct links between information items help decision makers mentally "chunk" these items, increasing the weight placed on the items in forming judgments. Consequently, we examine three format dimensions: *placement* of comprehensive-income items specifically in a performance statement, *labeling* of these items with the term comprehensive "income," and *linkage* between net income and other comprehensive-income items. These three dimensions compose the "performance signals" category, because all dimensions relate to whether comprehensive-income items are or are not identified as related to performance.

The first performance-signal dimension, placement, refers to whether comprehensive income appears in a performance or nonperformance statement. Presentation in a performance statement, such as a statement of comprehensive income (130IS), suggests that these items represent a measure of firm performance, i.e., how well the firm has performed economically for its shareholders (FASB 1999, para. 1.1). In contrast, presentation in a statement of stockholders' equity (115EQ and 130EQ) implies that these items are not performance-related since the statement focuses on equity funding and profit distribution, rather than profit creation (FASB 1999, para. 1.4). Thus, for the placement dimension, the 130IS format will have a positive effect on nonprofessional investors' weighting of UGL volatility, while the 115EQ and 130EQ formats will have negative effects.

The second performance-signal dimension, labeling, refers to whether comprehensive-income items such as UGL are explicitly labeled as comprehensive income. Because an "income" label traditionally denotes a performance measure (Stickney and Weil 1997, 106), associating UGL with that label will have a positive effect on weighting. This is the case for both the 130EQ and 130IS formats. In contrast, the 115EQ format does not label UGL as "income" and thus will have a negative effect on weighting.[8]

The third performance-signal dimension, linkage, focuses on the relations among financial-statement items. Specifically, linkage indicates the presence or absence of a direct association between net income and other comprehensive-income items such as UGL. SFAS No. 130 directly links these two items in two ways. First, it requires the items to be shown together as components of the comprehensive-income category. Second, it requires net income plus other comprehensive-income items to be summed and their total presented. Under SFAS No. 115, however, net income and UGL represent different categories in the statement of stockholders' equity and are not linked by a total. Thus, the 130IS and 130EQ formats will positively affect the weighting for UGL volatility, while the 115EQ format will negatively affect investors' weighting.

Dimensions Related to Cognitive Costs

Cognitive-psychology research suggests that formats influence information weighting by imposing differential cognitive costs on decision makers (Russo 1977). For example, Nisbett et al. (1981) document that presenting nondiagnostic data in an information display along with diagnostic information dilutes the weight placed on diagnostic information, due to increased costs of processing the irrelevant information. Similar results occur in auditing contexts (Hackenbrack 1992; Hoffman and Patton 1997; Shelton 1999). Fischhoff et al. (1978) further show that decision makers place less weight on aggregated data than they place on the same information that is disaggregated. Thus, our cognitive-costs category includes two format dimensions related to these processing costs: the *isolation* of comprehensive-income information from other information and the degree of *aggregation* of comprehensive-income items.

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[8] Although SFAS No. 130 does not require companies to use the specific term "comprehensive income" (FASB 1997, para. 10), the term is used explicitly in SFAS No. 130 and has been adopted by a significant number of companies.

Isolation refers to whether comprehensive income is the sole type of information presented in the financial statement. Comprehensive income presented in a statement of stockholders' equity (as in both the 115EQ and 130EQ formats) appears along with common stock, additional-paid-in capital, treasury stock, and retained earnings. An investor must expend additional cognitive costs to simultaneously process all of these items. In contrast, comprehensive income is the only information presented in the statement of comprehensive income (130IS). As a result, investors do not incur the cognitive costs of simultaneously processing additional information. The lower cognitive costs in the 130IS format will have a positive effect on the weighting of UGL volatility, while greater cognitive costs in both 115EQ and 130EQ will be associated with negative effects on weighting.

Finally, the three formats differ on the second cognitive-costs dimension, aggregation. Both of the SFAS No. 130 formats (130EQ and 130IS) present investors with the gross changes in comprehensive income on the face of the statement, thereby disaggregating this information. In contrast, the SFAS No. 115 format (115EQ) provides only net changes in comprehensive-income items. While information to calculate gross changes is available in 115EQ, it appears in other financial statements and footnotes and requires additional cognitive costs to disaggregate. Thus, we expect that the 130EQ and 130IS formats impose lower cognitive costs and positively affect the weighting of UGL volatility, while the 115EQ format is associated with greater cognitive costs and negatively affects weighting.

Table 1 summarizes our evaluation of the effects of these five dimensions on the weighting of UGL volatility for each of the three financial-statement formats. All five dimensions positively affect investors' weighting of UGL information when it is presented in the 130IS format and negatively affect the weighting of UGL when presented in the 115EQ format. Investors' judgments of corporate and management performance should therefore reflect greater weighting of UGL volatility when presented in a SFAS No. 130 statement of comprehensive income than when UGL appear in the SFAS No. 115 statement of stockholders' equity. The effects of the statement of stockholders' equity presentation under SFAS No. 130 (130EQ) are inconclusive given that three dimensions indicate positive and two dimensions indicate negative effects on weighting. Since the overall effect of the 130EQ format depends on the relative importance of each dimension, which is likely to be context-specific, we cannot make predictions as to whether weighting for the 130EQ format will be more similar to that for the 115EQ format or that for the 130IS format. We can, however, predict that the 115EQ and 130IS formats should provide boundary conditions for the 130EQ format, with the weighting in the 130EQ format greater than or equal to that in the 115EQ format and less than or equal to that in the 130IS format. Hypothesis 3 summarizes these predictions.

H3 (Weighting): Nonprofessional investors will place greater weight on UGL volatility when it is presented in the 130IS format than in the 115EQ format. Nonprofessional investors' weight on UGL volatility in the 130EQ format will fall between the weights for the 130IS and the 115EQ formats. The differential weighting between the formats will in turn result in similar differences in investors' performance judgments between high and low UGL volatility.

We examine nonprofessional investors' weighting of UGL volatility and their resulting judgments for three different performance measures: management's effectiveness at managing operations, stock risk, and stock value. To predict the effects of UGL volatility on these performance measures, we draw on research that examines the effects of net income volatility on stock valuation.

Archival research has shown that net income volatility is associated with higher betas (Beaver et al. 1970) and *ex ante* risk premia (Gebhardt et al. 1999). Studies using experimental and survey methods have also documented that investors' risk judgments increase with the variability of earnings (Farrelly and Reichenstein 1984; Farrelly et al. 1985; Lipe 1998b). Consistent with Ryan (1997), we argue that the volatility of other comprehensive-income items will also affect investors' risk perceptions.[9] Specifically, investors' perceptions of the riskiness of a firm's investment policy will increase with UGL volatility.[10] Because investing is a core activity for insurance companies, we expect the risk associated with investments to affect investors' overall assessments of the risk of the company's stock. Given that managers in financial-services companies are responsible for managing risks of investment portfolios, we also expect that investors' perceived UGL volatility will negatively affect their judgments of management's operating effectiveness.

Finally, we examine investors' judgments of per-share stock values because stock value represents a summary statistic of the company's overall performance. Studies investigating analysts' judgments (including Hirst and Hopkins 1998) typically report this measure, so it provides a comparative measure of performance between nonprofessional investors and analysts. However, nonprofessional investors rarely value stocks so they may have difficulty estimating stock value (SRI International 1987, 26). To the extent that nonprofessional investors can assess stock values, we expect stock values to decline with perceived UGL volatility.[11]

IV. EXPERIMENTAL METHOD

Ninety-five individuals enrolled in an evening M.B.A. program participated in our experiment and received $10 each as compensation for their time. On average, participants had personal investment experience of 5.77 years (ranging from zero to 25 years) and 5.93 years of business experience.[12] None of the participants had professional investment experience. Participants received materials related to one of two versions of an insurance company that reported either high or low UGL volatility over a three-year time period. The financial statements presented UGL information in one of three formats: 115EQ, 130EQ, or 130IS. We randomly assigned participants to one of the six between-subject experimental conditions created by factorially crossing the two levels of UGL and the three format presentations.

The study materials consisted of four components: general instructions, background information on the property-and-casualty-insurance industry and the fictional insurance company, three years of financial statements and footnotes for the company, and two question sets. Common-size statements for three companies in the insurance industry (Allstate,

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[9] As Ryan (1997) notes, however, archival research to date has not provided direct evidence on whether fair value accounting (e.g., recognizing UGL on investments) helps investors assess risk.

[10] The effect of a comprehensive-income component on risk is a function of both its variance and covariance with other comprehensive-income components. To avoid ambiguity, we designed our experiment so that the variance of UGL was the primary driver of the variance of comprehensive income.

[11] We investigated whether nonprofessional investors have significant ownership in insurance stocks. For the 33 companies in the March 26, 1999 edition of the *Value Line Investment Surveys* (Value Line 1999), noninstitutional ownership ranged from 4 to 99 percent of total shares, with a mean (median) of 49 percent (53 percent). Thus, individuals own approximately half of insurance company shares.

[12] Seventeen participants had no investment experience. While these individuals were distributed across the six experimental conditions, we performed supplemental ANOVAs and regressions using investment experience as a covariate. Results with the covariate (not reported) are qualitatively similar to those presented in Tables 2–5.

Chubb, and Nationwide) and statistics in Petroni and Wahlen (1995) served as the foundation for the company's financial statements.

Both versions of the company reported large and stable realized gains (and cash flows) on the sale of securities over the three years presented. For 19X1, 19X2, and 19X3, all income statement numbers were identical across the two versions: realized gains on the sale of securities were $101.2, $106.4, and $109.8 million and net income was $50.0, $50.9, and $51.8 million, respectively.

On the balance sheet, only investments and stockholders' equity differed due to the volatility of UGL reported across the three years. For the low-volatility version of the company, UGL arising in 19X1, 19X2, and 19X3 were $112.2, $104.5, and $107.2 million, respectively. In comparison, UGL arising in 19X1, 19X2, and 19X3 for the high-volatility version were $234.9, $10.6, and $78.4 million, respectively. The variance of these UGL over the three-year period was 15.26 and 13,233.26 for the low- and high-volatility versions, respectively. The sum of unrealized gains for the three years was $323.9 million, with the balance of UGL at the beginning of the three-year period (i.e., net UGL arising in prior periods) equal to $15.3 million for both volatility conditions. We set this initial pool of unrealized gains at a low level so that the effect of UGL arising during the three years would not be overwhelmed by pre-existing gains.

Since UGL differed yearly between the two volatility conditions, total comprehensive income also differed. For 19X1, 19X2, and 19X3, comprehensive income in the low-volatility version was $58.8, $49.6, and $50.1 million, respectively, and high-volatility comprehensive income was $155.2, $(24.0), and $27.3 million for the three years, respectively.

Participants could use information in the financial statements to calculate the average annual return on the company's investment portfolio. In the low-volatility version, the rate of return was approximately 8 percent per year. The rates of return in the high-volatility version were approximately 18 percent, 1 percent, and 6 percent for 19X1, 19X2, and 19X3, respectively. The experimental materials provided a benchmark for evaluating these returns by indicating that the return on the S&P 500 had ranged from 5 to 14 percent for the relevant time period, with a mean of approximately 8 percent. Finally, the materials also provided an average and inter-quartile range for price-earnings ratios in the property- and casualty-insurance industry for participants to use as a benchmark in making their stock-value judgments.

Participants responded to two separate sets of questions. In the first question set, they made several performance judgments. Management's effectiveness at managing operations was judged on a 14-point scale, with 1 indicating "not effective" and 14 indicating "very effective." The risk of investing in the company's stock was judged on a 14-point scale, with 1 indicating "low risk" and 14 indicating "high risk." Participants also provided a per-share dollar value for the stock.[13]

The second set of questions related specifically to UGL. Participants completed this question set without referring to any of the study materials or responses to the first set of questions. In these last questions, participants assessed the volatility of unrealized gains, indicated where UGL information was located in the financial statements, and responded to demographic questions about their business and investment experiences.

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[13] In addition to these three judgments, participants made two judgments in the second question set related to management's effectiveness at managing *investments* and the likelihood that the historical pattern of realized gains on investments would continue three years into the future. Results for these two judgments were qualitatively similar to those reported in Tables 3 and 4 for management's effectiveness for operations (MGTEFFECT) and the risk of investing in the company's stock (STOCKRISK).

V. RESULTS

Acquisition and Evaluation of UGL Information (H1 and H2)

Hypothesis 1 predicts that nonprofessional investors will read UGL information regardless of its presentation format. To test H1, we examine responses to the question in which participants recalled where UGL information appeared in the financial statements of the study materials. Of the 95 participants, seven answered incorrectly for their particular format condition. These seven participants, five in low- and two in high-volatility version, received UGL information in the 130EQ statement of stockholders' equity, but answered that UGL appeared in footnote disclosures only.[14] Results of a categorical ANOVA indicate no significant effects on acquisition of format ($\chi^2 = 2.92$, $p = 0.2323$), volatility ($\chi^2 = 0.09$, $p = 0.7663$), or the format-by-volatility interaction ($\chi^2 = 0.74$, $p = 0.6898$). This result indicates that format did not significantly affect whether participants read UGL information, as predicted by H1.

Hypothesis 2 predicts that because nonprofessional investors read UGL information in all formats, investors receiving high UGL volatility will perceive UGL to be more volatile than those receiving low UGL volatility. To test H2, we examine participants' perceptions of the volatility of UGL (denoted PVOL).

Table 2 reports descriptive statistics for UGL volatility assessments by format and volatility conditions (Panel A) and the results from two sets of contrasts for testing H2 (Panel B). As indicated by the means in Panel A, participants receiving the high-volatility version evaluated UGL as more volatile than those receiving the low-volatility version in all formats. The first set of contrasts in Panel B tests whether UGL volatility assessments differ significantly between the two volatility conditions. This difference is at least marginally significant for each of the three formats ($t = 2.25$, $p = 0.0686$ for 115EQ, $t = 2.09$, $p = 0.0757$ for 130EQ, and $t = 8.64$, $p = 0.0021$ for 130IS). The second set of contrasts tests whether differences in participants' volatility assessments between high and low UGL volatility varied between formats. The pairwise comparisons show no differences among formats ($t = -0.00$, $p = 0.9578$ for 130EQ vs. 115EQ, $t = 1.07$, $p = 0.2868$ for 130IS vs. 115EQ, and $t = 1.13$, $p = 0.2609$ for 130IS vs. 130EQ).[15] Supporting H2, these findings indicate that participants correctly evaluated UGL volatility in all presentation formats.[16]

Weighting of Perceived Volatility for Performance Judgments (H3)

Hypothesis 3 predicts that format will affect participants' judgments of corporate and management performance due to differences in the weightings of UGL volatility. Specifically, H3 predicts that the weights on UGL (and their effects on related performance judgments) will be greatest in 130IS, smallest in 115EQ, and between the weights of 115EQ and 130IS for 130EQ.

Tables 3–5 report descriptive statistics and tests of H3 for three judgments: one related to management performance and two related to corporate performance. Panel A in each

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[14] These seven individuals had an average of 5.1 years of investment experience so it is unlikely that their incorrect responses were due to inexperience with financial statements. Eliminating these individuals does not qualitatively affect the results, so they have been retained in all analyses.

[15] An ANOVA with format and volatility as independent variables also supports these results. The ANOVA shows a significant main effect for volatility ($F = 11.71$, $p = 0.0009$), an insignificant main effect for format ($F = 0.94$, $p = 0.3939$) and an insignificant format-by-volatility interaction ($F = 0.80$, $p = 0.4527$).

[16] Since the investment footnote provided amounts of gross unrealized holding gains and losses on investments at two balance-sheet dates, participants may have detected UGL volatility from the footnotes rather than the financial statements *per se*. In a supplemental experiment, however, 26 M.B.A. students assessed higher perceived volatility for the high vs. low UGL volatility using financial statements from the 115EQ condition without footnotes. This finding suggests that footnote information did not drive results in our primary experiment.

TABLE 2
Perceived UGL Volatility Assessments (H2)

Panel A: Mean Assessments (Standard Deviations) for Perceived UGL Volatility (PVOL)[a]

	Volatility		
Format[b]	Low	High	Difference (High-Low)[c]
115EQ	6.72 (2.77) n = 16	8.31 (3.36) n = 16	1.59*
130EQ	7.74 (2.59) n = 17	9.25 (2.82) n = 16	1.51*
130IS	6.13 (3.40) n = 16	9.36 (3.03) n = 14	3.23***

Panel B: Planned Contrasts

High vs. Low Volatility by Format

	t	p[c]
115EQ (High vs. Low volatility)	2.25	0.0686
130EQ (High vs. Low volatility)	2.09	0.0757
130IS (High vs. Low volatility)	8.64	0.0021

Pairwise Format Comparisons for Differences between High and Low Volatility

	t	p[d]
130EQ (High-Low) vs. 115EQ (High-Low)	−0.00	0.9578
130IS (High-Low) vs. 115EQ (High-Low)	1.07	0.2868
130IS (High-Low) vs. 130EQ (High-Low)	1.13	0.2609

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* and *** indicate significance at $p < 0.10$ and $p < 0.01$, respectively.

[a] Participants assessed the volatility of UGL (PVOL) on a scale of 1–14, with higher values representing greater volatility.

[b] The 115EQ format presents net changes in comprehensive-income components (i.e., UGL) in the statement of changes in stockholders' equity, as was required under SFAS No. 115. The 130EQ and 130IS formats represent two alternative presentations under SFAS No. 130, with 130EQ presenting gross changes in UGL in a statement of changes in stockholders' equity and 130IS presenting gross changes in UGL in a statement of comprehensive income.

[c] One-tailed tests are reported given directional predictions for the comparisons of high vs. low volatility.

[d] Comparisons are based on two-tailed tests since H2 predicts no difference among formats.

table presents descriptive statistics: the means and standard deviations for each judgment by format and volatility and the differences in mean judgments between high and low volatility, by format. Panel A also reports results of contrasts that test for differences between pairs of formats in the degree to which participants' judgments distinguish between high vs. low UGL volatility. A strength of this analysis is that it relies only on manipulated independent variables, but a weakness is that effects of format other than weighting could influence participants' judgments. Therefore, Panels B in Tables 3–5 present tests to directly examine the differential weighting of UGL volatility in performance judgments by regressing participants' performance judgments on their perceived UGL volatility assessments (PVOL).

First, to examine the weighting of PVOL for each judgment, we perform the following regression separately for each format:[17]

$$\mathrm{PAJ}_{ik} = \beta_0 + \beta_{1k}\,(\mathrm{PVOL}_i) + \varepsilon_{ik} \tag{1}$$

where:

PAJ_{ik} = performance assessment judgment k (e.g., management effectiveness) made by participant i;
PVOL_i = participant i's perceived volatility assessment; and
ε_{ik} = random error term for assessment k made by participant i;

Results of these regressions appear in the top halves of Panels B in Tables 3–5.

Second, to test for differences in the coefficients on PVOL among the three formats, we perform a regression for each judgment that pools observations for all formats, using indicator (dummy) variables to allow both the intercept and the coefficient on PVOL to vary by format.

$$\begin{aligned}\mathrm{PAJ}_{ik} = {} & \alpha_{0k} + \alpha_{1k}D_1 + \alpha_{2k}D_2 + \alpha_{3k}(\mathrm{PVOL}_i) + \alpha_{4k}(D_1 * \mathrm{PVOL}_i) \\ & + \alpha_{5k}(D_2 * \mathrm{PVOL}_i) + \eta_{ik}\end{aligned} \tag{2}$$

where:

PAJ_{ik}, PVOL_i are as defined in equation (1);
D_1 = 0 if format is 115EQ or 130IS, 1 if format is 130EQ;
D_2 = 0 if format is 115EQ or 130EQ, 1 if format is 130IS; and
η_{ik} = random error terms for assessment k made by participant i.

This pooled regression tests for differences in the coefficients on PVOL between 115EQ and the other two formats, 130EQ and 130IS. The 115EQ format is the baseline condition for estimating the coefficient on PVOL (α_{3k}), with indicator variables D_1 and D_2 representing 130EQ and 130IS, respectively. Thus, α_{4k} measures the difference for the coefficients on PVOL between the 130EQ and 115EQ formats and α_{5k} measures the difference between the 130IS and 115EQ formats. The difference in the coefficients on PVOL between the 130IS and 130EQ formats is represented by $\alpha_{5k} - \alpha_{4k}$. We test the pairwise differences among formats using the t-statistics related to the associated indicator-variable coefficients

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[17] For all regressions, we identified outliers using procedures described in Neter et al. (1989, chap. 11). Eight outliers were deleted for stock-value judgments. One participant did not provide a response for stock risk and five participants did not provide responses for stock value. None of the regressions exhibited heteroskedasticity at $p < 0.05$ based on White's test (White 1980). Equality of error variances across the three individual regressions by format could not be rejected at $p < 0.05$ for all three performance measures.

TABLE 3
Management Effectiveness Judgments (H3)

Panel A: Means (Standard Deviations) for MGTEFFECT[a]

	Volatility		
Format[b]	*Low*	*High*	*Difference (High-Low)*[c]
115EQ	7.28 (2.76) n = 16	8.50 (2.68) n = 16	1.22
130EQ	6.85 (2.66) n = 17	6.56 (3.10) n = 16	−0.29
130IS	7.31 (2.36) n = 16	5.71 (2.40) n = 14	−1.60**

Pairwise Format Comparisons for Differences between High and Low Volatility

	t	*p*[c]
130EQ (High-Low) vs. 115EQ (High-Low)	−1.14	0.1294
130IS (High-Low) vs. 115EQ (High-Low)	−2.07	0.0207
130IS (High-Low) vs. 130EQ (High-Low)	−0.97	0.1680

Panel B: Regressions of Management Effectiveness on Perceived UGL Volatility (PVOL)[d]

$$MGTEFFECT_i = \beta_0 + \beta_1(PVOL_i) + \varepsilon_i$$

	Coefficient Estimates (t-statistics in parentheses)		
Format	*Intercept*	*PVOL*	*Adjusted* R^2
115EQ (n = 32)	6.74 (5.27)***	0.15 (0.97)	−0.00
130EQ (n = 33)	5.91 (3.62)***	0.09 (0.52)	−0.02
130IS (n = 30)	8.60 (8.48)***	−0.27 (−2.21)**	0.12

Pairwise Format Comparisons of Differences in Coefficients on PVOL

$$MGTEFFECT_i = a_0 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3(PVOL_i) + \alpha_4(D_1 * PVOL_i) + \alpha_5(D_2 * PVOL_i) + \eta_i$$

	Differences in PVOL Coefficients	*t*[e]	*p*[c]
130EQ vs. 115EQ	−0.06 (α_4)	−0.25	0.4003
130IS vs. 115EQ	−0.42 (α_5)	−2.03	0.0226
130IS vs. 130EQ	−0.36 ($\alpha_5 - \alpha_4$)	−1.64	0.0519

(Continued on next page)

TABLE 3 (Continued)

** and *** indicate significance at $p < 0.05$ and $p < 0.01$, respectively.

[a] $MGTEFFECT_i$ is participant i's judgment of management's effectiveness at managing operations, on a scale of 1–14.

[b] The 115EQ format presents net changes in comprehensive-income components (i.e., UGL) in the statement of changes in stockholders' equity, as was required under SFAS No. 115. The 130EQ and 130IS formats represent two alternative presentations under SFAS No. 130, with 130EQ presenting gross changes in UGL in a statement of changes in stockholders' equity and 130IS presenting gross changes in UGL in a statement of comprehensive income.

[c] Given directional predictions for both volatility (H2) and format (H3) differences, one-tailed significance levels are reported.

[d] Participants assessed the volatility of UGL (PVOL) on a scale of 1–14, with higher values representing greater volatility.

[e] t-statistics relate to the α_4 and α_5 coefficients from the pooled regression and the test of $\alpha_5 - \alpha_4 = 0$.

(α_{4k} and α_{5k}) and difference in coefficients ($\alpha_{5k} - \alpha_{4k}$). These results appear in the bottom halves of Panels B in Tables 3–5.

Table 3 presents results for the judgments related to management's effectiveness at overseeing operations (MGTEFFECT), which should be negatively related to UGL volatility. Panel A indicates that participants' judgments appropriately distinguish between high and low UGL volatility only in the 130IS format. Contrast tests for differences in the degree to which judgments of management effectiveness reflected UGL volatility indicate a significant difference between 130IS and 115EQ ($t = -2.07$, $p = 0.0207$). However, we cannot reject that either the two statements of stockholder equity formats or the two SFAS No. 130 formats had similar effects on participants' judgments ($t = -1.14$, $p = 0.1294$ and $t = -0.97$, $p = 0.1680$, respectively).

Regression results in Panel B for participants' weighting of perceived volatility are largely consistent with results in Panel A. The coefficient on perceived UGL volatility is significantly negative in 130IS ($\beta_1 = -0.27$, $t = -2.21$), but not in either of the statements of stockholders' equity. The tests for differences in coefficients among formats indicate that the weight on PVOL is significantly more negative for 130IS than for 115EQ ($t = -2.03$, $p = 0.0226$) and 130EQ ($t = -1.64$, $p = 0.0519$). The PVOL weightings for the two statement of stockholders' equity formats are statistically indistinguishable ($t = -0.25$, $p = 0.4003$).

The results in Table 3 indicate that only 130IS prompts nonprofessional investors to reflect UGL volatility in judging management effectiveness. Additionally, as predicted by H3, the effects of 130EQ lie between those of 130IS and 115EQ. The results further suggest that the effects of 130EQ are indistinguishable from those of 115EQ, but the pooled regression provides some evidence that the 130IS format leads to greater weighting of UGL volatility relative to the 130EQ format.

Table 4 presents results for participants' judgments of stock risk, which should increase in UGL volatility. The results parallel those for management effectiveness reported in Table 3. Panels A and B of Table 4, respectively, indicate that participants distinguish between low and high UGL volatility, and significantly weight volatility, only when UGL are presented in the 130IS format. The pairwise format comparisons in Panel A show that the difference in risk judgments between high and low UGL volatility is greater for 130IS than 115EQ ($t = 1.55$, $p = 0.0630$), as predicted. Similarly, Panel B shows that participants place greater weight on perceived volatility in 130IS than 115EQ ($t = 2.14$, $p = 0.0173$).

TABLE 4
Stock Risk Judgments (H3)

Panel A: Means (Standard Deviations) for STOCKRISK^{a}

	Volatility		
Format^{b}	*Low*	*High*	*Difference (High-Low)*^{c}
115EQ	5.53 (2.79) n = 16	6.31 (2.91) n = 16	0.78
130EQ	7.00 (2.50) n = 16	7.88 (2.73) n = 16	0.88
130IS	5.00 (2.63) n = 16	7.93 (2.81) n = 14	2.93***

Pairwise Format Comparisons for Differences between High and Low Volatility

	t	*p*^{c}
130EQ (High-Low) vs. 115EQ (High-Low)	0.00	0.4727
130IS (High-Low) vs. 115EQ (High-Low)	1.55	0.0630
130IS (High-Low) vs. 130EQ (High-Low)	1.48	0.0716

Panel B: Regressions of Management Effectiveness on Perceived UGL Volatility (PVOL)^{d}

$STOCKRISK_i = \beta_0 + \beta_1(PVOL_i) + \varepsilon_i$

	Coefficient Estimates (t-statistics in parentheses)		
Format	*Intercept*	*PVOL*	*Adjusted R*^{2}
115EQ (n = 32)	6.64 (4.98)***	−0.10 (−0.58)	−0.02
130EQ (n = 32)	5.97 (4.00)***	0.17 (1.03)	0.00
130IS (n = 30)	3.59 (2.92)***	0.36 (2.49)***	0.15

Pairwise Format Comparisons of Differences in Coefficients on PVOL

$STOCKRISK_i = \alpha_0 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3(PVOL_i) + \alpha_4(D_1 * PVOL_i) + \alpha_5(D_2 * PVOL_i) + \eta_i$

	Differences in PVOL Coefficients	*t*^{e}	*p*^{c}
130EQ vs. 115EQ	0.27 (α_4)	1.13	0.1319
130IS vs. 115EQ	0.46 (α_5)	2.14	0.0173
130IS vs. 130EQ	0.19 ($\alpha_5 - \alpha_4$)	0.84	0.2011

(*Continued on next page*)

TABLE 4 (Continued)

*** indicates significance at $p < 0.01$.

[a] $STOCKRISK_i$ is participant i's judgment of the risk of investing in the company's stock, on a scale of 1–14.

[b] The 115EQ format presents net changes in comprehensive-income components (i.e., UGL) in the statement of changes in stockholders' equity, as was required under SFAS No. 115. The 130EQ and 130IS formats represent two alternative presentations under SFAS No. 130, with 130EQ presenting gross changes in UGL in a statement of changes in stockholders' equity and 130IS presenting gross changes in UGL in a statement of comprehensive income.

[c] Given directional predictions for both volatility (H2) and format (H3) differences, one-tailed significance levels are reported.

[d] Participants assessed the volatility of UGL (PVOL) on a scale of 1–14, with higher values representing greater volatility.

[e] t-statistics relate to the α_4 and α_5 coefficients from the pooled regression and the test of $\alpha_5 - \alpha_4 = 0$.

The results also indicate that while the regression coefficients do not significantly differ between 130IS and 130EQ ($t = 0.84$, $p = 0.2011$), participants' risk judgments in 130IS better distinguish between high and low UGL volatility relative to those in 130EQ ($t = 1.48$, $p = 0.0716$).

Finally, Table 5 presents results for participants' stock-value judgments, which should be negatively related to UGL volatility. Results for this judgment generally do not support H3. First, the differences in mean stock values between high and low volatility in Panel A are insignificant for each format, perhaps reflecting variability in value judgments arising from participants' inexperience in making such judgments. As discussed previously, nonprofessional investors typically do not estimate specific values for stocks (SRI International 1987, 26), so participants may have had difficulty making these judgments in the experiment.

Panel B shows that the coefficient on perceived UGL volatility is significantly negative for 115EQ ($\beta_1 = -1.23$, $t = -2.66$) and marginally negative for 130IS ($\beta_1 = -0.47$, $t = -1.42$), but is not significantly different from zero for 130EQ. Tests of differences in coefficients among formats show that none are significant in the predicted direction. These results are somewhat puzzling given the findings for management effectiveness and stock risk, again indicating that nonprofessional investors had difficulty with this judgment or that other unidentified factors affected participants' stock values.

Supplemental Experiment for Performance Assessment Judgments

In our primary experiment, we used a three-year UGL series corresponding to the time period typically provided in an annual report. Given our volatility manipulation, using three years of data made it impossible to avoid having a pattern in the series. In particular, our UGL series had a mixed pattern (high, low, medium for 19X1, 19X2, and 19X3, respectively), with an overall downward trend that was most noticeable in the high-volatility series. Therefore, we performed a supplemental experiment to examine the possibility that participants reacted to trend vs. volatility or that trend and volatility interacted. In this experiment, holding constant high UGL volatility, we manipulated trend at two levels. The first UGL pattern was the one used in the primary experiment ($234.9, $10.6, and $78.4 million for 19X1, 19X2, and 19X3, respectively). The second pattern of $90.8, $2.1, $231.0 for these three years had the same total UGL and approximately the same variance as the

TABLE 5
Stock-Value Judgments (H3)

Panel A: Mean (Standard Deviations) for VALUE (in dollars)[a]

	Volatility		
Format[b]	*Low*	*High*	*Difference (High-Low)*[c]
115EQ	31.92 (7.05) n = 14	30.40 (10.13) n = 12	−1.52
130EQ	32.70 (6.28) n = 14	32.76 (5.75) n = 16	0.06
130IS	32.28 (4.67) n = 13	30.28 (6.93) n = 13	−2.00

Pairwise Format Comparisons for Differences between High and Low Volatility

	t	p^d
130EQ (High-Low) vs. 115EQ (High-Low)	0.42	0.6646
130IS (High-Low) vs. 115EQ (High-Low)	−0.14	0.4501
130IS (High-Low) vs. 130EQ (High-Low)	−0.56	0.2894

Panel B: Regressions of Management Effectiveness on Perceived UGL Volatility (PVOL)[e]

$$VALUE_i = \beta_0 + \beta_1(PVOL_i) + \varepsilon_i$$

	Coefficient Estimates (t-statistics in parentheses)		
Format	*Intercept*	*PVOL*[d]	*Adjusted* R^2
115EQ (n = 26)	40.82 (10.44)***	−1.23 (−2.66)***	0.20
130EQ (n = 30)	34.93 (10.17)***	−0.27 (−0.67)	−0.02
130IS (n = 26)	35.09 (12.10)***	−0.47 (−1.42)*	0.04

Pairwise Format Comparisons of Differences in Coefficients on PVOL

$$VALUE_i = \alpha_0 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3(PVOL_i) + \alpha_4(D_1 * PVOL_i) + \alpha_5(D_2 * PVOL_i) + \eta_i$$

	Differences in PVOL Coefficients	t^f	p^d
130EQ vs. 115EQ	0.96 (α_4)	1.65	0.9491
130IS vs. 115EQ	0.76 (α_5)	1.40	0.9170
130IS vs. 130EQ	−0.20 ($\alpha_5 - \alpha_4$)	−0.36	0.3587

(Continued on next page)

TABLE 5 (Continued)

* and *** indicate significance at $p < 0.10$ and $p < 0.01$, respectively.

[a] $VALUE_i$ is participant i's valuation of a company's stock in dollars per share.

[b] The 115EQ format presents net changes in comprehensive-income components (i.e., UGL) in the statement of changes in stockholders' equity, as was required under SFAS No. 115. The 130EQ and 130IS formats represent two alternative presentations under SFAS No. 130, with 130EQ presenting gross changes in UGL in a statement of changes in stockholders' equity and 130IS presenting gross changes in UGL in a statement of comprehensive income.

[c] Comparisons between high and low volatility are based on one-tailed significance levels.

[d] Format comparisons are based on one-tailed tests.

[e] Participants assessed the volatility of UGL (PVOL) on a scale of 1–14, with higher values representing greater volatility.

[f] t-statistics relate to the α_4 and α_5 coefficients from the pooled regression and the test of $\alpha_5 - \alpha_4 = 0$.

first, but an upward tend.[18] Twenty-six M.B.A. students participated in the experiment. They assessed UGL volatility and judged management's effectiveness and stock risk for one of the two trend conditions (stock valuations were not elicited).

Results of this supplemental experiment indicate that the trend of UGL did not influence how volatility affected participants' judgments, i.e., there were no interactive effects of trend and volatility. Participants' average UGL volatility assessments and the coefficients related to the mapping of these assessments into their two performance judgments (corresponding to the β_1 regression coefficients on PVOL in Tables 3 and 4) did not differ between the two trends. These results suggest that trend did not influence the effects of volatility on participants' performance judgments in our primary experiment.

Although trend did not interact with volatility in our supplemental experiment, we found a direct effect of trend on one of participants' two judgments, stock risk. Participants judged stock risk to be greater for the downward- vs. upward-trend series. These findings suggest that trend may have contributed to the large difference between high and low volatility for risk in the 130IS format (Panel A of Table 4). Trend could not be the sole determinant of the difference, however, because participants did place significant weight on UGL volatility to arrive at their risk judgments (Panel B of Table 4). Additionally, we found no effect of trend on participants' judgments of management effectiveness in the supplemental experiment, suggesting that trend does not have the systematic effects indicated for volatility in our primary experiment.

VI. DISCUSSION AND CONCLUSIONS

The results of our experiment show that the financial-statement format for presenting comprehensive income did not significantly affect nonprofessional investors' acquisition and evaluation of that information, but generally did significantly influence their information weighting and resulting performance judgments. Our results suggest that SFAS No. 130 will affect nonprofessional investors' use of comprehensive-income items only if companies issue a separate statement of comprehensive income, rather than use the alternative statement of stockholders' equity format that is also currently permitted. Given that individual investors presently represent 45 percent of stock ownership (Browning et al. 1999) and have increasing participation in the market (Ip 1998), our findings suggest that the FASB's decision to allow alternative SFAS No. 130 formats will affect a significant group of investors.

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[18] We could not create strictly downward and upward trends since we needed a fairly large unrealized gain in 19X1 to generate realized gains of \$101.2. Recall that the unrealized gain carried over from the previous year (i.e., 19X0) was only \$15.3. We followed the practice used in the examples in SFAS No. 130 of having all gains flow through unrealized gains before being reclassified as realized gains on the sale of a security. This approach required unrealized gains of at least \$85.9 million (\$101.2 minus \$15.3) arising in 19X1.

Although we cannot reach definitive conclusions about which of the five format dimensions contributed to our findings, comparisons of the results for 130EQ to those of 115EQ and 130IS suggest that the placement in a performance statement and/or the isolation of comprehensive-income information are the primary contributors. Effects of the 130EQ format generally are more similar to those of 115EQ than 130IS and, as indicated in Table 1, placement and isolation are the only two dimensions for which this is the predicted pattern. These results are consistent with arguments made by the FASB and corporate managers that placement in a performance vs. nonperformance statement provides signals about the importance of comprehensive-income information.

Investigating the effects of format using an experimental research method is important given that most companies appear to be selecting the statement of stockholders' equity to present SFAS No. 130 information.[19] If the vast majority of firms elect the statement of stockholders' equity, there may not be sufficient variation in archival data to test differences between formats. Also, archival data may be confounded by self-selection problems because companies choosing the statement of comprehensive income may be those more effective at managing investments. Additionally, it is difficult to disentangle the individual effects of format for analysts and nonprofessional investors using aggregate measures such as market prices. As indicated by McDaniel and Hand (1996), experiments can examine accounting alternatives not commonly used in practice, as well as isolate effects of variables on different groups of financial-statement users.

Our results, in combination with Hirst and Hopkins (1998), suggest that presenting comprehensive-income items in a performance statement improves both nonprofessional and professional investors' judgments. From these two studies, we identify two specific factors that are likely to mediate the effects of format on investors' acquisition, evaluation, and weighting processes: type of investor (professional or nonprofessional) and type of business activity (core or noncore). Crossing these two variables forms a 2 × 2 matrix of mediating variables.

For professional investors such as analysts, the effects of format on performance judgments may depend on whether comprehensive-income information is related to core- or noncore-business activities. We expect that format will have little or no effect on analysts' acquisition of information related to core activities since this information is critical to the accuracy of their forecasts and stock recommendations.[20] That is, analysts will search for information related to core activities regardless of where it is located, consistent with Lipe's (1998a) arguments for the use of UGL by bank analysts. In contrast, as demonstrated in Hirst and Hopkins (1998), format can affect professional investors' acquisition of information related to noncore activities. Because noncore activities are less important to a company's valuation, they may not be included in analysts' valuation models and thus would be acquired only through accidental discovery in the search for more relevant information.

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[19] While we have not performed an extensive search of formats actually chosen by firms, we selected ten large financial-services firms and found that seven used a statement of stockholders' equity for their fiscal years ended 1998. A second sample of ten large firms in industries other than financial services revealed nine firms chose this format. Additionally, Smith and Robertson's (1999) informal survey of 200 companies (excluding financial institutions) indicated that very few firms chose the statement of comprehensive income.

[20] Mikhail et al. (1999) document that analysts' job stability is inversely related to their relative forecast accuracy, suggesting that forecast accuracy is important to analysts.

If analysts fail to acquire the information, they cannot include it in their performance or valuation judgments.

On the other hand, we expect the effects of format on nonprofessional investors' judgments will not differ between core and noncore activities, since these investors do not clearly distinguish between financial information for these two activities (SRI International 1987, 26, 29). Thus, nonprofessional investors are likely to acquire and evaluate characteristics of information for both core and noncore activities regardless of format.[21] However, as found in our experiment, nonprofessional investors will tend to rely on the financial statements to signal the importance of information, suggesting that the weight they attach to both core and noncore information will depend on presentation format. The signaling effects of financial-statement format are likely to be mitigated only by nonprofessional investors acquiring training in financial analysis.

Our results and those of Hirst and Hopkins (1998) are not directly comparable since both investor and business-activity types differ between the two studies. Future research could reconcile the two studies by examining the effects of format on: (1) nonprofessional investors' use of comprehensive-income information related to noncore activities, and/or (2) analysts' use of comprehensive-income information related to core activities. For the first, we predict results similar to those found in the current study, i.e., nonprofessional investors' judgments will be influenced by information related to noncore activities only when presented in a statement of comprehensive income. Results might reveal potential negative effects of using a performance statement, that is, the overweighting of noncore-activity information. Such a result, in comparison to results of our study, illustrates a trade-off faced by the FASB. In effect, the FASB has to balance the misallocation of resources created by nonprofessional investors' underweighting of core-activity information presented in a statement of stockholders' equity against the overweighting of noncore-activity information presented in a statement of comprehensive income. However, given that noncore activities typically occur less frequently than core activities and are smaller in magnitude, our findings related to the underweighting of value-relevant comprehensive-income information likely represent a more serious cost.

A second experiment could address the effects of format on professional investors' use of comprehensive-income information related to core activities. However, archival research has already documented that UGL are associated with stock prices and returns for insurance companies (Petroni and Wahlen 1995; Dhaliwal et al. 1999). We can reconcile the differences between these archival findings and those of Hirst and Hopkins (1998) since managing investments is a core activity for insurance companies, but is a noncore activity for electronics firms. Thus, Hirst and Hopkins' (1998) results may illustrate a situation where experts' valuation models, which generally provide accurate judgments, can be dysfunctional (Frensch and Sternberg 1989; Rosman et al. 1994; Bonner et al. 1996). Additionally, recent experimental research suggests the effects of different presentations may be reduced or eliminated as analysts become more familiar with the new formats (Maines et al. 1999).

Finally, one additional avenue for future research is to examine more thoroughly the effects of format dimensions (see Table 1) on individuals' acquisition, evaluation, and weighting. Rather than focusing on specific formats proposed by policy makers, these studies could manipulate aspects of the underlying format dimensions. This approach would enhance the applicability of our framework to format issues other than those related to comprehensive income.

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[21] However, seven of the 32 nonprofessional investors in the 130EQ format failed to indicate that they saw UGL in the statement of stockholders' equity, instead indicating that they acquired this information from the footnotes. Although this percentage (22 percent) is considerably less than that found by Hirst and Hopkins (1998) for professional investors (50 percent), it suggests that format may have some effect on acquisition for nonprofessional investors. In addition, since all participants in the 115EQ format correctly noted that UGL appeared in the statement of stockholders' equity, the effects on acquisition for nonprofessional investors appear to be unique to the statement of stockholders' equity allowed under SFAS No. 130.

APPENDIX
EXAMPLES OF COMPREHENSIVE-INCOME PRESENTATION FORMATS
(Note: Examples are for the high-volatility condition)

1. Statement of Changes in Stockholders' Equity–SFAS No. 115 format

DSM CORPORATION
STATEMENT OF CHANGES IN STOCKHOLDERS' EQUITY
For the Years Ended December 31, 19X3, 19X2, and 19X1

(in millions)	*19X3*	*19X2*	*19X1*
Common Stock	$ 15.9	$ 15.9	$ 15.9
Additional Paid-in Capital	322.3	322.3	322.3
Retained Earnings			
Beginning balance	172.2	137.2	103.1
Net income	51.8	50.9	50.0
Dividends	(15.9)	(15.9)	(15.9)
Ending balance	208.1	172.2	137.2
Unrealized Holding Gains on Investments			
Beginning balance	43.0	118.2	13.1
Change during the year	(24.9)	(75.2)	105.1
Ending balance	18.1	43.0	118.2
Foreign Currency Translation Gains			
Beginning balance	2.6	2.3	2.2
Change during the year	0.4	0.3	0.1
Ending balance	3.0	2.6	2.3
Total Stockholders' Equity	$567.4	$556.0	$595.9

2. Statement of Changes in Stockholders' Equity–SFAS No. 130 format

DSM CORPORATION
STATEMENT OF CHANGES IN STOCKHOLDERS' EQUITY
For the Years Ended December 31, 19X3, 19X2, and 19X1

(in millions)	*19X3*		*19X2*		*19X1*	
Common Stock	$ 15.9		$ 15.9		$ 15.9	
Additional Paid-in Capital	322.3		322.3		322.3	
Retained Earnings						
Beginning balance	172.2		137.2		103.1	
Net income	51.8	$ 51.8	50.9	$ 50.9	50.0	$ 50.0
Dividends	(15.9)		(15.9)		(15.9)	
Ending balance	208.1		172.2		137.2	
Accumulated Other Comprehensive Income						
Beginning balance	45.6		120.5		15.3	
Unrealized gains (losses) on investments, net of reclassification adjustment (see disclosure below)		(31.4)		(95.8)		133.7
Foreign currency translation gains		0.4		0.3		0.1
Other comprehensive income before income tax		(31.0)		(95.5)		133.8
Income taxes related to other comprehensive income		6.5		20.6		(28.6)
Other comprehensive income, net	(24.5)	(24.5)	(74.9)	(74.9)	105.2	105.2
Comprehensive Income		$ 27.3		$(24.0)		$155.2
Ending balance	21.1		45.6		120.5	
Total Stockholders' Equity	$567.4		$556.0		$595.9	

Disclosure of reclassification amount:			
Unrealized holding gains arising during the year	$ 78.4	$ 10.6	$234.9
Less: Reclassification adjustment for realized gains included in net income	(109.8)	(106.4)	(101.2)
Net unrealized gains (losses) on investments	$(31.4)	$(95.8)	$133.7

3. Statement of Comprehensive Income–SFAS No. 130 Format

DSM CORPORATION
STATEMENT OF COMPREHENSIVE INCOME
For the Years Ended December 31, 19X3, 19X2, and 19X1

(in millions)	*19X3*	*19X2*	*19X1*
Net Income	$ 51.8	$ 50.9	$ 50.0
Other Comprehensive Income:			
Unrealized holding gains arising during the year	78.4	10.6	234.9
Less: Reclassification adjustment for realized gains included in net income	(109.8)	(106.4)	(101.2)
Unrealized gains (losses) on investments, net of reclassification adjustment	(31.4)	(95.8)	133.7
Foreign currency translation gains	0.4	0.3	0.1
Other comprehensive income before income tax	(31.0)	(95.5)	133.8
Income taxes related to other comprehensive income	6.5	20.6	(28.6)
Other comprehensive income, net	(24.5)	(74.9)	105.2
Comprehensive Income	$ 27.3	$ (24.0)	$155.2

Footnote Disclosures–All formats (Note: Some text description differed by format.)

Investments

The company's investments are classified as available-for-sale securities. Interest income and dividends are recorded as revenues ("Investment Income"). In accordance with Statement of Financial Accounting Standard No. 115, investments are re-valued to their current market value, with the unrealized gain or loss for each year shown as "Other Comprehensive Income" in the Statement of Comprehensive Income. "Accumulated Other Comprehensive Income" is shown in the stockholders' equity section of the balance sheet.

When securities are sold the realized gain or loss on sale is recorded as "Realized Gains or Losses on Investments" in the Income Statement. At that time, any portion of the gain or loss that was previously shown as an unrealized gain or loss in "Other Comprehensive Income" is reclassified from "Other Comprehensive Income" to "Realized Gains or Losses on Investments" using a reclassification adjustment.

The gross unrealized holding gains and losses on fixed maturity and equity investments are shown below.

	Cost	*Gross Unrealized Holding Gains*	*Gross Unrealized Holding Losses*	*Market Value*
12/31/19X3				
Fixed Maturity	$891.8	$ 8.2	$ 3.3	$896.7
Equity	394.5	35.5	22.3	407.7
12/31/19X2				
Fixed Maturity	896.6	20.9	14.2	903.3
Equity	355.8	106.1	69.8	392.1

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The Value Relevance of Nonfinancial Measures of Air Pollution in the Electric Utility Industry

K. E. Hughes II
Louisiana State University

ABSTRACT: This study examines the relation between the market value of equity and nonfinancial pollution measures (sulfur dioxide emissions) that capture firms' exposure to future environmental liabilities. I find that a nonfinancial pollution proxy is value-relevant for high-polluting electric utilities targeted for air pollution abatement by Phase One of the 1990 Clean Air Act Amendments (CAAA). On average, these utilities' exposure to (unbooked) future environmental liabilities decreased their mean 1990 share price by 16 percent. Moreover, the value relevance of the nonfinancial pollution proxy (1) increased in response to the passage of the stringent 1990 CAAA environmental legislation, and then (2) declined as the market subsequently reduced estimated compliance costs in response to changing economic and technological factors. Utilities not targeted by Phase One of the 1990 CAAA faced minimal exposure to future environmental liabilities and I find no significant relation between their pollution indicators and share prices. I also find that investors in the high-polluting rate-regulated utilities that were targeted by Phase One positively value a favorable regulatory climate.

Key Words: *Nonfinancial information, Environmental liabilities, Market valuation, Utilities.*

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I. INTRODUCTION

Accounting policy makers and practitioners have called for increased external reporting of value-relevant nonfinancial information (Wallman 1996; AICPA 1994). Nonfinancial measures can help equity investors (and creditors) value intangible assets that are not recognized in historical cost-based accounting reports. For example, Amir and Lev (1996) show that nonfinancial indicators of sales-growth potential are value-relevant, and Ittner and Larcker (1998) conclude that firm value is positively related to nonfinancial measures of customer satisfaction. Nonfinancial measures can also help investors assess unbooked liabilities. A major source of unbooked liabilities is probable *future* costs that fail to meet the requirement in SFAS No. 5 (FASB 1975) that costs must be "reasonably estimable" to be accrued. Moreover, SFAS No. 5 pertains only to losses or asset impairments existing at the end of the accounting period. *Future* commitments, such as modifying production processes to prevent or reduce pollution, generally do not satisfy these criteria (Roberts 1995). Therefore, disclosure of the firm's exposure to *future* environmental liabilities arising from commitments to *prevent* or reduce pollution remains largely voluntary (Barth and McNichols 1994; Barth et al. 1997).[1]

This study complements and extends the work of Barth and McNichols (1994) and Johnson et al. (1998) on the value relevance of nonfinancial indicators of environmental (Superfund) remediation costs. Barth and McNichols (1994) introduced nonfinancial environmental indicators into an accounting identity-valuation model for a sample of firms facing significant potential costs for the clean up of Superfund sites. They found a negative relation between a nonfinancial measure, the number of Superfund sites for which a firm was a Potentially Responsible Party (PRP), and share price. This result suggests that investors assessed an unaccrued corporate liability, and discounted share price accordingly. More recently, Johnson et al. (1998) confirm Barth and McNichols' (1994) findings, and additionally report a negative relation between a firm's *legal* (aggregate) release of toxic chemicals and firm value.

While the inter-industry research designs employed by these studies produce results that are unlikely to be attributable to the idiosyncrasies of a single industry, they have limited ability to control for nonhypothesized industry-specific value-drivers. Accordingly, I focus on the electric utility industry to examine the value relevance of nonfinancial air pollution measures over a period surrounding the enactment of Title IV of the 1990 Clean Air Act Amendments (1990 CAAA). Phase One of the 1990 CAAA required certain specified generating units to reduce sulfur dioxide (SO_2) emissions by 1995.

This study extends and helps triangulate inferences from prior research in three ways.[2] First, I use a single-industry design that provides a useful complement to inter-industry designs. The single-industry research design allows the incorporation of industry-specific controls for other (nonhypothesized) value-drivers in order to further isolate the valuation effect of environmental exposure.

Second, the nature of Phase One of the 1990 CAAA created a treatment group of utilities that was expected to be importantly and negatively affected by the Act and another group of utilities whose exposure to future abatement costs was expected to be small. Thus, the natural experiment created by the 1990 CAAA produced both a treatment and a control group, allowing the research design to control for both industry-specific and macroeconomic influences, while isolating the effect of the firm's exposure to future environmental liabilities on its market value.

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[1] Although the SEC's Staff Accounting Bulletin No. 92 suggests that registrants segregate amounts related to *future* environmental actions from other environmental expenditures like remediation, Barth et al. (1997, 49) did not generally find this level of detail in the disclosures they examined.

[2] Additionally, while prior studies have largely focused on the valuation effects of *remediation* costs, this study extends the investigation to a measure of *preventative* costs. This is important because reducing air pollution continues to be a key topic of national and (with respect to global warming) international debate, and air pollution abatement costs are preventative.

Third, this study extends prior research on the value relevance of nonfinancial measures by explicitly hypothesizing that this value relevance changes over time.[3] Specifically, I hypothesize that the value relevance of nonfinancial environmental indicators varies across firms and over time in response to exogenous changes in environmental regulation and endogenous changes in the firm's production processes. For example, the passage of the 1990 CAAA is an exogenous event that is expected to increase the value relevance of nonfinancial environmental (pollution) indicators. Conversely, firms can subsequently change endogenous production processes to reduce pollution and environmental exposure, which in turn decreases the value relevance of nonfinancial pollution indicators. Additionally, changes in economic and technological factors may cause estimates of future compliance costs to change over time, which also affects the associated value relevance of pollution indicators. Therefore, examining these expected time-varying relations between environmental exposure and firm value permits more demanding analyses than do general tests of association.

The study's results indicate that the nonfinancial pollution proxy is value-relevant for the high-polluting utilities targeted by Phase One of the 1990 CAAA.[4] Targeted utilities' exposure to (unbooked) future environmental liabilities decreased their mean 1990 share price by 16 percent, on average. Thus, the market assessed a significant unbooked environmental liability for these firms. In contrast, for utilities not targeted by Phase One, I found no significant relation between the relative pollution of their emissions and their share prices. The study also documents that for the targeted utilities, the value relevance of the nonfinancial pollution proxy (1) increases in response to the passage of the stringent 1990 CAAA environmental legislation, and then (2) declines as the market subsequently reduces estimated compliance costs in response to changing economic and technological factors. The study's research design renders evidence that the value relevance of the nonfinancial environmental measure increases with exposure-increasing forces, and declines with exposure-decreasing forces. This helps assure that the estimated value relevance of the nonfinancial pollution measure is attributable to its role as proxy for the market's estimation of unbooked environmental liabilities, rather than to unspecified correlated omitted factors.

Furthermore, because Loudder et al. (1996) found that regulatory climate influences the value of rate-regulated utilities, I also examine this possibility. A favorable regulatory climate is one in which regulators are generally more prompt and generous in their response to utilities' rate adjustment requests. I expect that exposed utilities in more favorable regulatory jurisdictions will be able to pass a larger portion of the burden of unbooked liabilities on to customers than would utilities in less favorable regulatory jurisdictions. Consistent with this expectation, I find that when high-polluting utilities face significant estimates of future environmental costs, investors positively value a favorable regulatory climate.

The body of evidence presented here suggests that disclosure of value-relevant nonfinancial information such as pollution measures can provide one avenue for moving from "financial" to "business" reporting, as recommended by the Jenkins Committee (AICPA

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[3] Neither Barth and McNichols (1994) nor Johnson et al. (1998) explored the time-varying nature of the relation between environmental exposure and firm value. For example, Barth and McNichols (1994, Table 5) report the means of ten annual regressions in addition to pooled (fixed-effects) results.

[4] The terms "high-polluting" and "low-polluting" are used for expositional purposes only.

1994). Importantly, the objective nature of these nonfinancial pollution measures also renders them suitable for audit, which could enhance the credibility of such disclosures (Beets and Souther 1999).

The remainder of this study is organized as follows: Section II describes the impact of Title IV of the 1990 CAAA on the electric utility industry; Section III introduces the valuation model; and Section IV presents its empirical results. Conclusions and implications appear in Section V.

II. TITLE IV OF THE 1990 CAAA AND INVESTOR-OWNED ELECTRIC UTILITIES

Prior to 1990, electric power generating plants were releasing roughly 70 percent of nationwide emissions of sulfur dioxide (SO_2), with old coal-fired plants[5] contributing 90 percent of these emissions (136 Cong. Rec. H2513, H2536-37 [daily ed. May 21, 1990]). Electric utilities were also a leading source of nitrogen oxides (NO_x). When SO_2 and NO_x emissions are released into the atmosphere, they combine with water vapor and return to the earth's surface as acid deposition, popularly known as acid rain.

Throughout the 1980s, Congress heavily debated strengthening the provisions of the 1970 Clean Air Act, as evidenced by more than 70 legislative proposals addressing acid rain (Burtraw 1996). A dramatic political change affected this debate following the 1988 elections. As a result, "1989 began with clean air at the top of everyone's legislative list" (Waxman 1991, 1732). Shortly thereafter, Congress passed the Clean Air Act Amendments of 1990 (1990 CAAA).

Title IV of the 1990 CAAA specifically addresses the acid rain problem by reducing allowable SO_2 emissions from electric utility generating plants by more than one-half. This reduction was implemented in two phases and incorporated market-based incentives for affected utilities to seek least-cost solutions. Phase One required 110 large (100 Megawatts or greater) coal-burning plants in the eastern and midwestern U.S. to reduce SO_2 emissions by 3 to 4 million tons by 1995. The statute specifically identified these plants and listed their allowed SO_2 emissions by generating unit (U.S.C. 7651c, Table A). Of the 110 facilities named, seven were operated by the federal government (Tennessee Valley Authority) and four were run by electric cooperatives. Investor-owned utilities, many of which were operated through utility holding companies, controlled the remaining 99 Phase One units.[6] Thus, most of the cost of Phase One compliance fell on investor-owned, rate-regulated utilities.[7]

Public Utility Commissions (PUCs) generally provide regulatory oversight of such rate-regulated electric utilities. These state agencies are responsible for establishing "just and reasonable" rates by calculating an allowed, risk-adjusted rate of return to an approved capital base. To the degree that this rate-adjustment process is efficient in passing through to rate-payers the costs of complying with environmental regulations, the regulatory process buffers investors from exposure to future environmental liabilities.

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[5] In 1990, over 55 percent of the electricity in the U.S. was generated from coal-fired plants, and utility coal consumption had nearly doubled since the mid-1970s (Helme and Neme 1991).

[6] Phase Two of the legislation, commencing in 2000, further tightens SO_2 emission limits and affects most electric utilities operating fossil-fuel generating plants. The 1990 CAAA also addressed NO_x reductions. However, unlike the limits placed on SO_2 emissions, reductions in NO_x were not specified in the 1990 law but were promulgated by the EPA at a later date.

[7] Initial estimates of these costs were significant. For example, Potomac Edison initially estimated that its cost to comply with the 1990 CAAA would eventually equal 26 percent of total investment to provide utility service to customers (Norris 1992). One report estimated that the cost to comply with the law's SO_2 emissions requirements would be nearly \$81.2 billion for just the Tennessee Valley Authority, Georgia Power, Public Service of Indiana, and Ohio Power (*Electric Light and Power* 1992).

However, the regulatory process does not protect investors from all risks, but rather balances risks between the shareholder and the rate payer. Public pressure to contain utility rates assures that PUCs recognize only those costs that pass a test of "prudence." This provides regulatory incentives to encourage cost reduction (Joskow and Schmalensee 1986), and limits a utility's ability to efficiently pass-through costs to rate payers. The manner in which a rate-setting body provides incentives for efficient operation, while approving "prudent" rate increases for utilities operating within its jurisdiction, along with the time it takes to resolve these issues, are reflected in the jurisdiction's "regulatory climate."

Regulatory climate measures the efficiency of the rate-adjustment process from the perspective of the utility's shareholder, as tracked by investment services such as *Value Line, Solomon Brothers,* and *Duff & Phelps.*[8] The observed variation in regulatory climate ratings suggests that jurisdictions vary in the efficiency with which they pass-through costs to rate payers, and these variations may additionally affect the efficient cost recovery of 1990 CAAA compliance costs.[9] This significant cost "shock" to those utilities affected by Phase One should increase investor sensitivity to the importance of the jurisdiction's regulatory climate in recovering the 1990 CAAA's compliance costs.

The watershed 1989 congressional debate that culminated in the enactment of the CAAA in 1990 made it clear that affected utilities' future environmental liabilities would increase. However, and in hindsight, initial estimates of these liabilities were quite upwardly biased. The 1990 CAAA allowed each utility to choose a market-based, least-cost compliance strategy. For example, facilities affected by the 1990 CAAA's emissions cap were allowed to trade SO_2 allowances (one allowance permits one ton of SO_2 emissions). Firms with relatively high abatement costs could purchase additional emission allowances from firms with lower costs so that firms could collectively meet emission standards more cost-efficiently than they could individually. The statute's flexibility increased firms' potential compliance strategies, which in turn increased the range of possible future costs, and exacerbated the difficulties of estimating future cash flows. Initial estimates of complying with the 1990 CAAA were therefore very rough, as this was the government's first attempt in using a market-based approach to attain environmental compliance.

By mid-1992, the market for SO_2 allowances revealed that the cost of complying with the 1990 CAAA would be significantly less than initially expected.[10] The initial estimates likely failed to foresee that: (1) the real price of low-sulfur coal would significantly *decrease* in spite of *increasing* demand (U.S. Department of Energy, Energy Information Administration 1997); (2) the installation of "scrubbers" would enable utilities to continue burning high-sulfur coal while "overcomplying" in reducing emissions, freeing thousands of SO_2 allowances for the market; and (3) allowance prices (which approximate the marginal cost of compliance), originally estimated at $1,500/ton prior to 1990, would fall to less than $265/ton by mid-1992. As these events unfolded, cost estimates for compliance declined.

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[8] Teets (1989) found considerable agreement among the regulatory climate ratings of *Value Line, Duff & Phelps,* and *Solomon Brothers.*

[9] To provide more direct evidence on the average regulatory efficiency for this study's sample firms and sample period, I aggregated the results of requests for rate adjustments settled by Phase One utilities during 1990. Regulators approved an average of just 61 percent of the amount requested, while taking an average of eight months to resolve a utility's request for a rate adjustment.

[10] For example, in 1990, the EPA and the President's Council of Economic Advisors' estimated that Phase One compliance would cost $12 billion per year by 1995 (Mason 1991), but annualized compliance costs are currently estimated to be only $836 million (U.S. Department of Energy, Energy Information Administration 1997).

Much of this re-evaluation occurred when utilities filed compliance plans with their PUCs prior to the end of 1992. Therefore, utilities affected by Phase One of the 1990 CAAA faced the highest environmental exposure between 1989, when its probability of enactment dramatically increased, and 1992, when new compliance and economic information revealed that costs of compliance would be much less than initially expected.

III. THE VALUATION MODEL

To investigate the value relevance of toxic emissions as a nonfinancial measure of the firm's environmental exposure, this study incorporates off-balance-sheet, environmental-indicator information in an accounting-valuation model. The valuation model I use relies on the accounting identity in which the market value of equity equals the market value of a firm's assets minus its liabilities. Because the market value of assets and liabilities are unobservable, the operational model sets the market value of equity equal to the recorded book values of assets and liabilities. Additional (off-balance-sheet) independent variables are then introduced to better explain the market value of equity. Several researchers have examined the value relevance of disclosed, but not accrued, financial information with different variants of this model (e.g., Landsman 1986; Beaver et al. 1989; Barth 1991, 1994; Barth et al. 1991; Petroni and Whalen 1995.)

Following Barth and McNichols (1994), I adjust the book value of assets and the book value of liabilities for the fair value of pension assets and accumulated benefit obligations, respectively. To mitigate collinearity I then collapse these asset and liability variables into the book value of equity (BVE). Following Barth and McNichols (1994), both the market value of equity (MVE) and BVE are deflated by the number of shares outstanding. I include the following off-balance-sheet environmental-exposure and regulatory-climate variables in the model (predicted signs appear in parentheses):

EMIT (−): Average percentage of SO_2 emitted per year relative to total (airborne) emissions ($SO_2 + NO_x + CO_2$). This variable captures the degree to which the average emission is polluted. Title IV of the 1990 CAAA focuses on reducing SO_2 emissions, so this pollutant represents a firm's exposure to future environmental liabilities. Emissions are totaled over all of the firm's fossil-fuel generating plants.

CLIM (+): Annual average of the quarterly *Value Line* assessments of the regulatory environment (from the shareholder's perspective, how favorably the PUC addressed requested rate increases): below average (−1), average (0), and above average (+1).

To isolate any valuation effect stemming from an investor-owned electric utility's exposure to future environmental liabilities, one must control for other potentially value-relevant, industry-specific factors. First, utilities operating nuclear-powered generating facilities receive close public scrutiny. The potential for a nuclear mishap, such as the 1979 Three Mile Island incident, and the safe disposal of radioactive waste and spent fuel induce a "nuclear" environmental risk. Nuclear power plants are also expensive to construct, usually resulting in higher consumer electric rates. Therefore, "nuclear-intensive" utilities with higher cost structures are at a competitive disadvantage if deregulated. Second, utilities also generate nonnuclear waste, and have been named as Potentially Responsible Parties (PRPs) for Superfund hazardous waste sites. Finally, many electric utilities have diversified their operations into nonregulated, nonutility lines of business. Berger and Ofek (1995) found that diversification reduced firm value due to over-investment and cross-subsidization of poorly performing segments. However, diversification into nonregulated lines of business may provide rate-regulated firms with opportunities to earn higher returns than those allowed by regulators (i.e., growth opportunities). To control for these potentially value-relevant cross-sectional differences, the analysis includes the following control variables:[11]

NUCS (−): Percentage of power generated by nuclear units to total power generated by the firm.

SITE (−): The number of Superfund sites for which the firm has been designated a PRP, divided by total industry Superfund sites.[12]

DIVERSE (+/−): The percentage of "other" (or nonutility derived) revenues to total revenues. As this proxy may represent over-investment and cross-subsidization (Berger and Ofek 1995), or growth opportunities, the direction of this control variable's effect is not predicted.

The model to be estimated is thus:

$$\mathbf{MVE} = \alpha + \beta_1\mathbf{BVE} + \beta_2\mathbf{EMIT} + \beta_3\mathbf{CLIM} + \beta_4\mathbf{NUCS} + \beta_5\mathbf{SITE} + \beta_6\mathbf{DIVERSE} + e_t \qquad (1)$$

where MVE equals the market value of equity, BVE equals the book value of equity, and the other variables are defined previously.

The regression model is estimated for each year during the period 1986–1993 for the high-polluting electric utilities affected by Phase One of the 1990 CAAA and then separately for the low-polluting utilities that were not specifically identified in Phase One. The expectations for the key variables follow:

1) β_2, the coefficient of EMIT, will not differ significantly from zero for the low-polluting firms in all years, 1986–1993.
2) β_2, the coefficient of EMIT, will be negative for the high-polluting firms in the years of high future environmental liability exposure, 1989–1991, but will not significantly differ from zero in all other years where future environmental liability exposure is lower.
3) β_3, the coefficient of CLIM, will not differ significantly from zero for the low-polluting firms in all years, 1986–1993.
4) β_3, the coefficient of CLIM, will be positive for the high-polluting firms in the years of highest investor sensitivity to future environmental liability exposure, 1989–1991, but will not significantly differ from zero in all other years where future environmental liability exposure is lower.

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[11] The sample period (1986–1993) largely precedes deregulation and subsequent competition in the electric utility industry. Although some competition at the wholesale level has existed since the passage of the Public Utility Regulatory Act of 1978, the Energy Policy Act of 1992 initiated the deregulation of electrical generation. The rules implementing this legislation were not promulgated until 1993, and the Blacconiere et al. (1997) study of the electric utility industry found that their proxy for competition was not significant until 1993. In any event, this study's inferences are unaffected by inclusion of proxies for competition during 1992 and 1993, as explained in footnote 20.

[12] Inferences are unaffected if this variable is scaled by shares outstanding, or is unscaled.

IV. RESULTS

Descriptive Statistics

The study's sample firms appear in Table 1. Table 1 designates as "Phase One Utilities" those owning even a minority interest in Phase One generating units that are listed in Table A of the 1990 CAAA. "Non-Phase One" utilities have no generating units designated in the statute. The total sample includes all investor-owned electric utilities for which the following data are available: sulfur dioxide (SO_2), nitrogen oxide (NO_x), and carbon dioxide (CO_2) emissions compiled from the Department of Energy emissions data base (collected from Form EIA-767); Compustat annual information; and *Value Line* quarterly Investment Surveys. The Superfund Enforcement Tracking System (SETS) database provided the number of Superfund sites for which a utility has been designated a PRP. Information on nuclear operations and diversification appears in *Public Utilities Reports Inc.*'s analysis of investor-owned electric and gas utilities. These sample criteria result in 44 Phase One and 46 Non-Phase One firms, which collectively represent all major U.S. investor-owned electric utilities.

Descriptive statistics appear in Table 2. Phase One and Non-Phase One utilities do not significantly differ in MVE, BVE, CLIM, NUCS, and SITE. This homogeneity suggests that Non-Phase One firms are an appropriate control group. As anticipated, the Phase One firms have, on average, significantly higher emissions of sulfur dioxide ($\alpha \leq 0.0001$).[13]

Table 3 presents parametric (Pearson) and nonparametric (Spearman) pairwise correlations among variables. The parametric and nonparametric correlations yield similar inferences. Firms with larger market values have larger book values of equity and larger percentages of revenue from nonutility lines of business. Firms with greater dependence upon nuclear power generation have larger book values, reflecting the relatively higher construction costs of these facilities. More diversified firms tend to emit less SO_2 as a percentage of total emissions, and are associated with more favorable regulatory climates. Firms with more Superfund sites depend more heavily on nuclear power and are associated with more unfavorable regulatory climates.

Multiple Regression Analysis

The results of the annual cross-sectional regressions appear in Table 4 for Phase One firms and in Table 5 for Non-Phase One firms.[14] In both tables, the financial data for 1986 may be ill-conditioned: the adjusted R^2s and F-statistics are significantly lower in 1986 than in other years for both Phase One and Non-Phase One firms. However, for the 1987 to 1993 period, the mean adjusted R^2 is 0.60, comparable to Barth and McNichols' (1994) mean adjusted R^2 of 0.55.

Table 4 shows that EMIT is significantly negative for Phase One firms in 1989, 1990, and 1991, when environmental exposure is greatest. These results suggest that during the 1989 to 1991 period, investors valued the environmental exposures of Phase One firms as "unbooked" liabilities and discounted firm value accordingly. To assess the economic impact of environmental exposure on Phase One utilities' market value of equity during this

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[13] Ironically, the highest polluter as measured by EMIT is a Non-Phase One utility that owns no generating units meeting the "100 Megawatt or greater" criterion for Phase One. This utility is subject to Phase Two emission limitations commencing in the year 2000.

[14] I used variance inflation factors (VIFs) (Belsley et al. 1980) to assess collinearity. All VIFs were less than 2, indicating that collinearity is not a problem. I also deleted outliers identified by the Belsley et al. (1980) criteria. The largest number of observations dropped in one year was three. White's (1980) test failed to reject the null hypothesis of homoskedasticity and correct model specification for all 16 annual regressions, so I report t-statistics based on OLS standard errors.

TABLE 1
Investor-Owned Electric Utilities Classified as to whether Affected by Phase One of Title IV of the 1990 Clean Air Act Amendments

Phase One Utilities (n = 44)[a]		*Non-Phase One Utilities (n = 46)*	
Allegheny Power System	KU Energy	Boston Edison	Northeast Utilities
American Electric Power Inc.	LG&E	Carolina Power & Light	Oklahoma Gas & Electric
Atlantic Energy	Long Island Lighting	Cent. Louisiana Electric	Orange & Rockland Utilities
Baltimore Gas & Electric	Midwest Resources	Central & South West Corp.	Otter Tail Power
Centerior Energy	New York State Electric & Gas	Central Hudson G & E	Pacific Gas & Electric Co.
Cincinnati Gas & Electric	Niagara Mohawk Power Corp.	Central Maine Power	PACIFICORP
CIPSCO	NIPSCO Industries	CILCORP	Pinnacle West Capital
CMS Energy	Northern States Power Co.	Commonwealth Energy Sys.	Portland General
Commonwealth Edison	Ohio Edison	Consolidated Edison	Public Service of Colorado
Delmarva Power & Light	Pennsylvania Power & Light	Detroit Edison	Public Service of New Mex.
Dominion Resources Inc.	Philadelphia Electric Co.	Duke Power Co.	Puget Sound Power & Light
DPL	Potomac Electric Company	El Paso Electric Co.	Rochester Gas & Electric
DQE	PSI Resources	Entergy Corp.	San Diego Gas & Electric
Empire District Electric	Public Service Enter. Group	Florida Progress	SCANA
General Public Utilities	Southern Co.	FPL Group Inc.	SCECORP
IES Industries	Southern Indiana G & E	Gulf States Utilities	Sierra Pacific Resources
Illinois Power	TECO Energy	Hawaiian Electric Industries	Southwestern Public Service
Interstate Power	Union Electric Co.	Houston Industries Inc.	St. Joseph Light & Power
Iowa–Illinois Gas & Electric	UTILICORP United	Idaho Power	Texas Utilities Co.
Iowa Southern Inc.	Wisconsin Energy	Minnesota Power & Light	TNP Enterprises
IPALCO Enterprises	Wisconsin Public Service	Montana Power	Tucson Electric Power
Kansas City Power & Light	WPL Holdings	Nevada Power	United Illuminating
		New England Electric Sys.	Washington Water Power

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[a] The 1990 Clean Air Act Amendments (U.S.C. 7651c, Table A) specifically identified generating units owned by these utilities.

TABLE 2
Descriptive Statistics for Phase One and Non-Phase One Electric Utilities Using Eight-Year, Firm-Specific Means (1986–1993)[a]

	Phase One Firms (n = 44)					*Non-Phase One Firms (n = 46)*					*Wilcoxon Rank Sum Test*	*t-test*
Variable	*Mean*	*Std. Dev.*	*Min.*	*Max.*	*Median*	*Mean*	*Std. Dev.*	*Min.*	*Max.*	*Median*	*Prob> |Z|*	*Prob> |T|*
MVE	28.208	6.454	15.813	45.500	28.922	28.950	7.517	9.911	42.781	29.406	0.513	0.617
BVE	25.092	6.027	13.031	39.588	24.391	26.332	5.697	15.959	41.894	25.528	0.693	0.606
EMIT	0.011	0.004	0.003	0.022	0.011	0.005	0.005	0.000	0.035	0.004	0.0001	0.0001
CLIM	−0.127	0.553	−1.000	1.000	0.000	−0.089	0.484	−1.000	1.000	0.000	0.580	0.724
NUCS	0.162	0.178	0.000	0.744	0.147	0.130	0.158	0.000	0.610	0.059	0.329	0.360
SITE	0.019	0.023	0.000	0.093	0.013	0.037	0.109	0.000	0.066	0.011	0.768	0.268
DIVERSE	0.018	0.032	0.000	0.163	0.001	0.049	0.079	0.000	0.400	0.014	0.082	0.013

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[a] All statistics (i.e., max., min.) are based on eight-year, firm-specific means.
The variables are defined as follows:

MVE = Market value of common equity divided by shares outstanding.
BVE = Book value of equity adjusted for the fair value of pension plan assets and benefit value of obligation, divided by shares outstanding.
EMIT = SO_2 emissions as a percentage of total emissions.
CLIM = *Value Line* assessment of the regulatory climate.
NUCS = Percentage of total utility power generated by nuclear units.
SITE = Number of Superfund sites for which the firm is designated a PRP divided by total Superfund sites for the investor-owned utility industry.
DIVERSE = The ratio of ''other'' (nonutility) revenues to total revenues.

TABLE 3
Correlation Coefficients (p-values) Based Upon Eight-Year, Firm-Specific Means (1986–1993)
Pearson Coefficients in Upper Right and Spearman Coefficients in Lower Left (n = 90)[a]

	MVE	*BVE*	*EMIT*	*CLIM*	*NUCS*	*SITE*	*DIVERSE*
MVE		0.752 (0.0001)	−0.073 (0.4886)	0.089 (0.404)	0.187 (0.0773)	0.039 (0.7103)	0.279 (0.0076)
BVE	0.703 (0.0001)		0.034 (0.7512)	−0.027 (0.8006)	0.319 (0.0021)	0.148 (0.1634)	0.035 (0.7399)
EMIT	−0.096 (0.3691)	0.016 (0.8797)		−0.051 (0.6392)	0.027 (0.7956)	0.1064 (0.3207)	−0.219 (0.0378)
CLIM	0.136 (0.1991)	−0.067 (0.5299)	−0.013 (0.8998)		−0.052 (0.6249)	−0.254 (0.0159)	0.231 (0.0285)
NUCS	0.081 (0.4484)	0.276 (0.0084)	0.051 (0.6383)	−0.072 (0.4977)		0.261 (0.013)	−0.169 (0.112)
SITE	0.002 (0.9844)	0.053 (0.6221)	0.079 (0.4592)	−0.213 (0.0437)	0.211 (0.0465)		−0.081 (0.4508)
DIVERSE	0.242 (0.0214)	−0.007 (0.9444)	−0.195 (0.0652)	0.176 (0.0962)	0.002 (0.9886)	0.094 (0.3787)	

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[a] The variables are defined in Table 2.

TABLE 4
Valuation Model Regressions for Phase One "High-Polluting" Utilities, 1986–1993
Coefficients (t-statistics)

Year	*n*	α	$\beta_1(+)$ *(BVE)*	$\beta_2(-)$ *(EMIT)*	$\beta_3(+)$ *(CLIM)*	$\beta_4(-)$ *(NUCS)*	$\beta_5(-)$ *(SITE)*	$\beta_6(+/-)$ *(DIVERSE)*	*Adj. R^2* *F-value*	*White's p-value*
1986	44	11.4042	0.8493	−189.5199	2.8190	5.5629	−194.9647	9.5684	0.3059	
		(0.213)	(3.772)*	(−0.560)	(1.185)	(0.728)	(−2.251)**	(0.134)	4.158	0.6504
1987	43	7.9131	0.7237	−173.7404	1.3783	3.3843	−116.0571	20.4550	0.5180	
		(1.586)	(5.623)*	(−0.759)	(0.814)	(0.492)	(−2.099)**	(0.403)	8.522	0.6819
1988	44	3.1490	0.8330	5.6986	2.1211	−1.5885	−30.0907	67.3943	0.6272	
		(0.884)	(7.802)*	(0.040)	(1.465)***	(−0.309)	(−0.590)	(1.984)**	13.055	0.9956
1989	44	6.7117	0.9756	−232.1847	1.7991	−3.7661	−56.2490	49.5734	0.7601	
		(2.070)**	(10.741)*	(−1.681)**	(1.499)***	(−0.883)	(−1.208)	(1.834)**	23.709	0.7658
1990	43	8.7493	0.8761	−395.8146	2.4672	−2.5489	−43.7140	59.7078	0.7516	
		(3.119)*	(10.839)*	(−2.637)*	(1.951)**	(−0.707)	(−0.986)	(2.664)*	22.185	0.5215
1991	42	11.6995	1.0233	−409.1364	4.0104	−2.5424	−126.0108	1.6805	0.7595	
		(3.245)*	(9.753)*	(−2.149)**	(3.331)*	(−0.536)	(−2.133)**	(0.071)	22.582	0.7433
1992	40	8.5169	0.9441	−25.1722	3.5965	−11.1432	−18.8174	40.6240	0.6931	
		(2.883)*	(8.886)*	(−0.142)	(3.483)*	(−3.152)*	(−0.383)	(2.049)**	15.680	0.4493
1993	41	5.8434	1.0661	62.0017	3.1006	−10.2772	−3.8540	18.1884	0.6213	
		(1.509)	(8.078)*	(0.298)	(2.418)*	(−2.107)**	(−0.072)	(1.366)***	11.936	0.3210
1989–1991										Hausman
Random	129	10.2828	1.0108	−555.6814	2.4425	−5.7006	−82.2654	23.5899	0.7722	p-value
Effects		(4.413)*	(17.613)*	(−5.408)*	(2.828)*	(−2.369)*	(−2.631)*	(2.918)*		0.5072

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*, **, *** p-values (one-tailed for predicted signs) are ($p < 0.01$), ($p < 0.05$), and ($p < 0.10$), respectively.

The variables are defined in Table 2.

period, I began by computing the 1990 (the year in which EMIT is most significant) mean values of MVE ($26.92) and EMIT (0.0110795). *Ceteris paribus,* the mean level of environmental exposure decreased the mean 1990 share price for Phase One firms by $4.38 (395.8146 × 0.0110795), or 16.3 percent ($4.38/$26.92).[15] The pattern of the annual regression results in Table 4 highlights the time-varying nature of the environmental-exposure firm-value relation, and reveals the vulnerability of polluting firms to adverse valuation effects stemming from increased environmental regulation.

In contrast, EMIT is neither significant before 1989 nor after 1991 for Phase One firms, nor, as shown in Table 5, in any year for unaffected Non-Phase One firms. The significantly negative relation between the market value of equity and the pollution proxy arises only for firms with exposures to future environmental liabilities (Phase One firms), and only during the years when environmental exposure is expected to be greatest.

For Phase One utilities, Table 4 shows that CLIM is marginally significant in 1988 and 1989, and then is significantly positive thereafter. CLIM is neither significant for Phase One firms before 1988, nor is it significant for Non-Phase One firms in any of the annual regressions (Table 5). These results suggest that increased exposure to future environmental liabilities heightens investor sensitivity to regulatory climate. The results are consistent with expectations in that CLIM is significant for Phase One firms (high-polluters) but not Non-Phase One firms (low-polluters) during the 1989–1991 period of increased environmental exposure. The results are also consistent with the expectation that CLIM is not significant for Phase One firms in 1986 and 1987—a period well before the exogenous 1990 CAAA legislation increased these firms' environmental exposure. However, CLIM's continuing significance for Phase One firms in 1992 and 1993, well *after* the 1990 legislation, was not anticipated. The continuing significance of CLIM (but only for Phase One firms) suggests investors' sensitivity to exposed firms' regulatory climate persists after changes in environmental exposure. Persistent sensitivity could be attributable to the fact that during the early 1990's economic slow-down, regulators held rate adjustments down, and with the 1992 economic recovery, they allowed more efficient pass-through of (previously restrained) requests for rate increases.[16] To the extent that regulators restrained legitimate rate increase requests by Phase One firms in the early 1990s, regulatory climate would continue to be important until rates increased enough to recover these costs.

Tables 4 and 5 show that the nuclear operations variable (NUCS) is significantly negative in five of the 16 annual regressions. This provides weak evidence that investors discount firm value because of the risk inherent in nuclear operations and/or higher cost structures of nuclear-dependent utilities.

The proxy for environmental costs associated with Superfund sites (SITE) is significantly negative for Phase One firms in 1986, 1987, and 1991, and for Non-Phase One firms in 1987.[17] The timing of this negative SITE effect is largely coincident with a major, related exogenous event that heightened the exposure of firms with designated PRP sites—the 1986 Superfund Amendments and Reauthorization Act (SARA). This result suggests that passage of more extensive Superfund legislation exacerbated the (negative) value relevance of the number of PRP sites.

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[15] Analogous computations reveal a decrease in the median share price of $4.52, or 17.1 percent.

[16] Consistent with this explanation, *Value Line* analysts' regulatory climate ratings increased (improved) more significantly ($p < 0.05$) for Phase One utilities (89 percent) than for Non-Phase One utilities (56 percent) over the period 1991 to 1993. Increasingly favorable regulatory climates reflect increasingly efficient cost recovery by affected utilities, which investors may translate into a positive valuation effect.

[17] These results are not necessarily inconsistent with Barth and McNichols (1994), as only 10 percent of their firms were utilities.

TABLE 5
Valuation Model Regressions for Non-Phase One "Low-Polluting" Utilities, 1986–1993 Coefficients (t-statistics)

Year	*n*	α	$\beta_1(+)$ *(BVE)*	$\beta_2(-)$ *(EMIT)*	$\beta_3(+)$ *(CLIM)*	$\beta_4(-)$ *(NUCS)*	$\beta_5(-)$ *(SITE)*	$\beta_6(+/-)$ *(DIVERSE)*	*Adj.* R^2 *F-value*	*White's p-value*
1986	43	3.7536 (0.655)	1.0769 (4.893)*	169.6104 (0.930)	2.0493 (0.670)	−17.1170 (−1.912)**	−77.4885 (−1.151)	4.9336 (0.323)	0.3745 5.192	0.4378
1987	43	−1.1686 (−0.256)	1.0249 (6.362)*	76.4598 (0.271)	1.7966 (0.713)	−9.1062 (−1.499)***	−98.6918 (−1.355)***	0.8716 (0.076)	0.4682 7.163	0.6681
1988	46	3.9530 (0.971)	0.8283 (5.883)*	54.3146 (0.229)	1.4946 (0.643)	−8.4369 (−1.450)***	−25.0079 (−0.324)	13.3539 (1.246)	0.4096 6.203	0.2441
1989	46	2.1230 (0.485)	0.9788 (5.934)*	−209.4882 (−0.892)	−0.4163 (−0.187)	2.9642 (0.411)	−1.1087 (−0.014)	33.5981 (2.745)*	0.5048 8.645	0.2981
1990	46	0.7359 (0.168)	1.0586 (6.337)*	−121.5666 (−0.677)	0.3971 (0.182)	−7.9834 (−1.155)	41.3469 (0.414)	10.0569 (0.763)	0.4574 7.323	0.7553
1991	46	4.9026 (1.288)	1.1039 (7.963)*	−136.7936 (−0.580)	1.8588 (0.890)	−6.4996 (−0.884)	37.1026 (0.384)	3.5606 (0.270)	0.5772 11.238	0.7840
1992	45	2.5052 (0.808)	1.1439 (9.080)*	−89.8286 (−0.607)	1.3059 (0.846)	−6.4886 (−1.114)	84.3459 (1.140)	12.6198 (1.109)	0.6683 15.772	0.6136
1993	43	2.9952 (0.814)	1.0913 (6.944)*	97.6926 (0.307)	1.0967 (0.575)	−3.7185 (−0.536)	35.0621 (0.460)	3.4853 (0.481)	0.5751 10.475	0.5554
1989–1991 Random Effects	138	1.8281 (0.691)	1.0224 (12.600)*	1.0754 (0.009)	3.8483 (3.190)*	−1.7852 (−0.425)	−16.5494 (−0.340)	13.4599 (1.920)**	0.5549	Hausman p-value 0.3334

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*, **, *** p-values (one-tailed for predicted signs) are ($p < 0.01$), ($p < 0.05$), and ($p < 0.10$), respectively.
The variables are defined in Table 2.

The diversification variable (DIVERSE) is significantly positive in five of the eight annual cross-sectional regressions for Phase One firms, but in only one for Non-Phase One firms. This positive relation between diversification and the market value of equity suggests that, at least for Phase One firms, entry into nonregulated lines of business on average reflects growth options.[18]

To increase the efficiency in estimating the model for the period in which environmental exposure is greatest, I pool the 1989 to 1991 data. A Hausman test reveals no significant correlation between the random error term and the regressors, indicating that a random-effects model is most appropriate in analyzing the panel data (Greene 1993, 479). The results of the random effects model appear at the bottom of Tables 4 and 5 (dummy variables for the years are not shown).

In the pooled regressions, EMIT is significantly negative for the Phase One firms (Table 4), but remains insignificant for the Non-Phase One firms (Table 5). Thus, the pooled regression results further support the prediction that investors discount firm value only for significantly exposed firms (i.e., high-polluting firms over the years 1989–1991, in this study's context). Table 4 also shows that for Phase One firms, CLIM is significantly positive, indicating that investors in environmentally exposed firms positively value a favorable regulatory climate. However, Table 5 shows that while CLIM is insignificant in the Non-Phase One firms' annual regressions, it becomes significantly positive in the 1989–1991 pooled regression.

To test whether the valuation effects of EMIT and CLIM differ significantly across Phase One vis-à-vis Non-Phase One utilities, I run an additional random effects model: (1) pooling high- and low-polluters together, and (2) adding a dummy variable for high-polluters that interacts with both EMIT and CLIM. For EMIT, the difference in the slope coefficients is significantly negative ($p < 0.02$). That is, for a given level of pollution, the market exacts a significantly greater penalty on the prices of Phase One firms than on the prices of Non-Phase One firms, as expected. For CLIM, the difference in the slope coefficients is significantly positive ($p < 0.01$). Investors in Phase One firms place significantly more value on a positive regulatory climate than do investors in Non-Phase One firms.[19]

In sum, the regression results reported in Tables 4 and 5 provide evidence that the nonfinancial environmental proxy EMIT is significantly negatively associated with firm value only for Phase One firms (high-polluters) and then only during the period of greatest environmental exposure (1989–1991). The nonfinancial regulatory climate proxy CLIM is significantly more positively associated with firm value for Phase One firms than for Non-Phase One firms, suggesting that investors in environmentally exposed firms place more value on a favorable regulatory climate than do investors in less exposed firms.

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[18] DIVERSE is not simply a proxy for firm size. Pair-wise correlations between (1) DIVERSE and (2) total assets or total liabilities are less than 0.05.

[19] Table 4 suggests that as the rate-regulated firm's environmental exposure increases, investors also increasingly value a favorable regulatory climate. Therefore, any interaction effect between the firm's environmental exposure and regulatory climate should be positive. To test for an interaction between EMIT and CLIM, I introduce an interaction variable, EMIT × CLIM, into the model. Because of near-collinearity (VIFs exceed 10, when a value of 5 is considered severe [Judge et al. 1988, 869]) between CLIM and EMIT × CLIM, CLIM is dropped from the model. This specification thus assumes that regulatory climate affects firm value only through the environmental exposure variable. I find that the EMIT main effect remains significantly negative only for Phase One firms, and only in the period of greatest environmental exposure (1989–1991), consistent with the inferences drawn from the specification reported in Tables 4 and 5. The EMIT × CLIM interaction coefficients are significantly positive for Phase One firms in 1988 and all years thereafter, but none of the Non-Phase One interaction coefficients are statistically significant. This evidence is consistent with that reported in Tables 4 and 5 in that the favorable CLIM effect occurs only for Phase One firms, and then only in 1988 and thereafter. The interaction specification reported here further suggests that the negative valuation effects of high-polluters' SO_2 emissions are mitigated if the utility has a favorable regulatory climate. Tables 4 and 5 present analyses based on the main CLIM effect only because: (1) collinearity constrains the empirical model to either the main CLIM effect or the CLIM × EMIT interaction, and (2) CLIM affects all requests for rate adjustments, not just those to recover environmental costs, so CLIM's effect on firm value extends far beyond its effect on the valuation of environmental costs.

Sensitivity Analyses

To assess the model's sensitivity to changes in specification, I repeated the original analysis: (1) using two alternative deflators for the financial variables (total revenues and millions of kilowatt hours sold); and (2) including net income in the model (Ohlson 1995). I also repeated the analysis without deflating the financial variables, but instead including the deflator (shares outstanding) as an additional independent variable (Barth and Kallapur 1996). Additionally, for the 1989 to 1991 period I replaced the variables in the original "levels" model with first differences. Finally, because some electric utilities are combined with natural gas retail and distribution, while others are not, I added a dummy variable to test for differences between these two groups. Inferences from all alternative specifications are consistent with those drawn here.[20]

To price SO_2 emissions, I repeat Table 4's regressions using: (1) unscaled values of MVE and BVE, so the dependent variable is denominated in dollars, and (2) raw SO_2 emissions instead of EMIT. Because unscaled SO_2 can proxy for a size effect, I also include unscaled total emissions to control for size.[21] For 1990 high-polluting utilities, the coefficient on the raw SO_2 emissions is significantly negative, –0.001682 ($p < 0.04$). The mean (median) 1990 value for raw SO_2 emissions is 235,213 tons (141,302 tons). Thus, the mean (median) cost per average ton of SO_2 emitted in 1990 is $395.60/ton ($237.60/ton). This cost per ton of emitted SO_2 is consistent with the initial market prices of traded Phase One SO_2 allowances.[22] Using the model's 1990 mean cost of $395.60/ton and the targeted Phase One reduction of approximately 3.5 million tons of SO_2, the model estimates an annual cost of $13.8 billion, consistent with prior economic estimates (e.g., in 1990 the EPA and the President's Council of Economic Advisors' estimated annualized costs for complying with Phase One of $12 billion [Mason 1991]). The consistency of the model's estimates of Phase One's economic costs with prior economic projections and observed market prices provides additional confidence in the study's results.

The "levels" accounting-valuation model employed in this study is subject to correlated omitted variables (Skinner 1996). To help address this concern, the study uses: (1) a single-industry design that permits inclusion of industry-specific control variables; (2) an intra-industry control group to control for any unspecified macro-economic effects; (3) a multiple-year analysis that tests for predicted changes over time in the value relevance of the nonfinancial environmental proxy; (4) sensitivity analysis to changes in model specification; (5) panel data models that are less sensitive to potential bias resulting from correlated omitted variables; and (6) *ex post* economic analysis that reveals that the model's estimates are consistent with observed market prices and prior economic estimates. Collectively, these design features enhance the study's internal validity.

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[20] Although older plants may produce an inordinate share of air pollution, plant age is not driving the significance of the environmental variable since correlations between EMIT and *Value Line* estimates of plant age were statistically insignificant. To investigate whether competitive market forces preceding deregulation affected coefficient estimates during 1992 and 1993, I introduce into the model two (alternative) variables used to proxy for the firm's competitive position (D'Souza 1998). After including these variables, I find that: (1) the study's inferences regarding the variables of interest (EMIT and CLIM) are not changed; (2) the coefficients on the competitive positioning variables are insignificant except for low-polluters in 1992, and; (3) changes in the significance of the control variables, NUCS and DIVERSE, suggest that in 1992 and 1993, these variables may partially reflect the firm's competitive position.

[21] Inferences from this specification are consistent with those reported in Tables 4 and 5.

[22] The first bilateral trades of emission allowances occurred in July 1992 when the TVA purchased 10,000 allowances from Wisconsin P&L at $265/allowance. Subsequently, Ohio Edison purchased 25,000 allowances from ALCOA (joint owner of a Phase One plant) for $300/allowance (Joskow et al. 1996).

V. CONCLUSIONS AND IMPLICATIONS

Peters (1987, 488) warned, "Our fixation with financial measures leads us to downplay or ignore less tangible nonfinancial measures....Yet these are increasingly the real drivers of corporate success over the middle to long term." Management has since begun to incorporate nonfinancial measures in both performance evaluation and decision making. This study contributes to recent research suggesting that nonfinancial measures can be equally informative to external stakeholders.

This study uses a nonfinancial measure (toxic emissions) to examine the relation between the firm's exposure to (unbooked) future environmental liabilities and the market value of the firm's common equity. Given sufficient exposure, I find that investors discount the equity value of environmentally exposed firms. Specifically, investors exact a share-price penalty linked to the degree to which emissions are polluted, but only for utilities targeted for pollution abatement by Phase One of the 1990 CAAA. For Phase One utilities, the penalty was significant. *Ceteris paribus*, these utilities' exposure to (unbooked) future environmental liabilities decreased their mean 1990 share price by 16.3 percent. Thus, the market assessed a significant unbooked environmental liability for these utilities. In contrast, for utilities not affected by the legislation, I found no significant relation between the relative pollution of emissions and share price.

In addition to cross-sectional variation, the study also documents variation over time in the value relevance of nonfinancial pollution measures. For the high-polluting utilities targeted by Phase One of the 1990 CAAA, the value relevance of the nonfinancial pollution indicator: (1) increases in response to an exogenous increase in the stringency of environmental regulation—the passage of the 1990 CAAA—and then (2) declines as the market reduces initially estimated compliance costs in response to changing economic and technological factors. This is evidence that the value relevance of nonfinancial environmental indicators increases with exposure-increasing forces and then declines with exposure-decreasing forces. This pattern of results provides a compelling argument that the value relevance of the nonfinancial pollution measure is indeed attributable to its role as an indicator for the market's estimation of unbooked environmental liabilities. This evidence also highlights polluters' vulnerability to adverse valuation effects triggered by exogenous events. Management may choose to reduce this vulnerability over time by adopting less-polluting production methods and integrating environmental policy with corporate strategy (Epstein 1996).

The evidence further suggests that pollution is a *necessary*, but not *sufficient* condition to prompt investors to discount firm value. That is, the market does not always view environmental pollution as a significant unbooked environmental liability, but appears to do so when environmental exposure is high.

The study's results also show that favorable regulatory climates are valued more positively by investors in high-polluting Phase One utilities. Presumably, from the shareholders' perspective, the increased costs associated with 1990 CAAA compliance could be recovered more efficiently in such climates.

This study's results triangulate with Barth and McNichols' (1994) and Johnson et al.'s (1998) conclusion that nonfinancial measures are value-relevant proxies for unbooked environmental liabilities. This study extends their inferences by revealing that this value relevance varies predictably across firms and over time, with differences in environmental exposure. The body of research examining the value relevance of nonfinancial measures as proxies for unbooked environmental liabilities complements the growing literature on the value relevance of nonfinancial measures as proxies for unbooked intangible assets (e.g., Amir and Lev 1996; Ittner and Larcker 1998). On the whole, these streams of research suggest that, under certain conditions, nonfinancial measures of unbooked liabilities (e.g., pollution proxies) and unbooked intangible assets (e.g., brand values, customer bases) are significantly associated with firm value. Disclosure of such value-relevant nonfinancial information could provide the accounting profession one means of moving from "financial" to "business" reporting as recommended by the Jenkins Committee (AICPA 1994), while supplying public accounting with new opportunities to remain a competitive provider of value-relevant information (Elliot 1994). Moreover, the objective nature of the nonfinancial pollution indicators in this study renders them suitable for audit, potentially increasing the credibility of such disclosures (Beets and Souther 1999).

While these environmental measures are currently impounded into price even without appearing in audited financial reports, nonaccounting disclosure may be less efficient and more costly to investors than mandated accounting disclosure. For example, although firms currently collect and report numerous environmental measures to regulators, the aggregation and disentangling of this information from multiple government offices is costly to investors. Disclosure of a manageable number of key nonfinancial performance indicators may provide a more efficient and less costly means of broadly disseminating such information.

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Reporting Bias

Paul E. Fischer
Pennsylvania State University
Robert E. Verrecchia
University of Pennsylvania

ABSTRACT: We present a simple model of managerial reporting bias for a setting in which the capital market is uncertain about the manager's reporting objective. In this setting, the manager's reporting bias reduces the value relevance of the manager's report; that is, it adds noise to the report. Through comparative static results, our model yields insights into factors that affect the slope and intercept terms in a regression of price on earnings. Specifically, we find that the information content of the manager's report, as captured by the earnings slope coefficient, falls as the private cost to the manager of biasing reports falls, and as the uncertainty about the manager's objective increases. We also find that the magnitude of the adjustment for the expected amount of bias, as captured by the absolute value of the intercept, falls as the uncertainty about the manager's objective increases. Finally, to highlight conditions under which managers would lobby to retain an option to bias reports (i.e., retain reporting flexibility), we analyze the effect of the option to bias on the manager's welfare. For example, we show that the *ex ante* benefit from biasing the report is positive if there is sufficient uncertainty about the manager's reporting objective.

Key Words: *Bias, Disclosure, Reporting discretion.*

I. INTRODUCTION

Standard setters and users of accounting information often claim that unobservable bias (e.g., earnings manipulation) reduces the usefulness, or value relevance, of reports of firm performance. For example, the Financial Accounting Standards Board (FASB) asserts in Statement of Financial Accounting Concepts No. 2:

> To be reliable, information must have representational faithfulness and it must be verifiable and neutral....Accounting information may not represent faithfully what it purports to represent because it has one or both of two kinds of bias. (FASB 1995, 56)

This paper has benefited from workshop participants' comments at the University of British Columbia, the University of Chicago, Dartmouth College, the University of Michigan, the University of Minnesota, Notre Dame University, Penn State University, Southern Methodist University, as well as from comments received in conjunction with presentations at the 1998 European Accounting Association meetings and the 1998 American Accounting Association meetings. Finally, we would like to thank Raffi Indjejikian and an anonymous referee for their helpful suggestions and comments, and Lihong Liang and Edward Riedl for their editorial assistance.

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The FASB refers to bias arising from the measurement method, and bias arising from the measurer's application of the measurement method. Our paper addresses the latter.

Users of accounting information express similar concerns about bias, as indicated in the Association for Investment Management and Research (AIMR) report, which states:

> In addition to timely dissemination, fairness also requires neutrality—presentation of data that are without bias. (Knutson 1993, 37)

Despite the compelling nature of these claims, in many models of financial reporting biasing activity does not affect the value relevance of a financial report.[1] These prior models assume that users of the report: (1) develop rational expectations, and (2) have perfect common knowledge of the preparer's reporting objective. These two assumptions generally imply that, in a rational expectations equilibrium, users of the report perfectly "back out" any bias in the report. For example, when users of the report know the preparer has incentives to set his report to 10 plus the earnings observed, users simply subtract 10 from the report to infer perfectly the underlying earnings. Consequently, the bias in the report does not affect the information content of the report.

Our paper presents a simple model of financial reporting that shows how reporting bias can affect informativeness. Our model assumes that a risk-neutral manager of a firm observes the firm's earnings, and then makes a potentially biased report of earnings to a risk-neutral market. Thus, bias in our model is the difference between the realization of earnings and the manager's *actual* earnings report. The manager's motivation to bias reports is that he seeks to manipulate the market's valuation of the firm, subject to some cost associated with bias. The market, however, does not know the manager's marginal benefit from manipulating the price; that is, we relax the assumption that the market knows the manager's reporting objective. Because the market is unable to observe the manager's objective, the market is unable to perfectly adjust for the bias the manager adds to the report. The market's (user's) inability to perfectly adjust for the manager's bias effectively means that, from the market's perspective, the manager's biasing activity adds noise to the report. In other words, reporting bias reduces the information content of the report. Consistent with this intuition, we show that more bias reduces the association between share price and reported earnings, and reduces the extent to which price reflects all available information.

The model allows us to derive a number of empirically relevant comparative static results. We show how the cost to the manager of biasing the report and the market's uncertainty about the manager's objective affect the slope (e.g., earnings association) *and* the intercept term in a regression of market price on the earnings report. Specifically, we find that the information content of the manager's report, as captured by the earnings slope coefficient, falls as the private cost to the manager of biasing reports falls, and as the uncertainty about the manager's objective increases. We also find that the magnitude of the adjustment for the expected amount of bias, as captured by the absolute value of the intercept, falls as the uncertainty about the manager's objective increases.

We also consider the value to the manager of the option to bias the report. In prior models the manager generally ends up taking costly actions to bias the report despite the fact that the market perfectly anticipates this bias. This result implies that the manager is worse off with the option to bias.[2] Consequently, these models suggest that managers would lobby to reduce reporting discretion that makes it possible for them to bias reports. In our model, in contrast, the market correctly anticipates the manager's bias *on average* (not perfectly). Because the market imperfectly anticipates the manager's bias, our model yields the result that managers may be better off with the option to bias. Thus, our model suggests that some managers would lobby to retain reporting discretion.

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[1] For an example in the earnings management literature see Verrecchia (1986). See also the literature concerned with myopic investment behavior, for example, Narayanan (1985), Stein (1989), or the survey in Hirshleifer (1993).

[2] This is often referred to as "shoot oneself in the foot" behavior because biasing is costly to the manager and yields no benefit. See, for example, Narayanan (1985), Stein (1989), or the survey in Hirshleifer (1993).

The remainder of the paper proceeds as follows. The next section briefly reviews related literature. Section III introduces a game in which a manager makes potentially biased reports of firm performance. We characterize an equilibrium to this game in Section IV. We present comparative static results and empirical predictions in Section V. In Section VI we consider the value of the option to bias to the manager. A final section summarizes our findings.

II. PRIOR MODELS OF REPORTING BIAS

Prior work has considered capital market settings in which private information is not fully revealed in equilibrium.[3] For example, Dye (1988) considers a setting in which there is uncertainty about the manager's reporting objective, or, more precisely, the manager's optimization problem. Specifically, in Dye's (1988) model the manager's feasible reporting space and/or the cost of bias is uncertain. Sansing (1992) and Trueman and Titman (1988) also analyze models in which the feasible reporting space of the manager is uncertain. None of these papers, however, directly considers the questions that motivate our analysis: (1) how does bias affect the informativeness of an earnings report; (2) how does the extent of uncertainty regarding the manager's reporting objective affect the informativeness of his earnings report; and (3) how does the option to bias affect the manager's welfare? Instead, Dye (1988) focuses on identifying the conditions that give rise to earnings management, Sansing (1992) focuses on explaining the differential price responses to good news and bad news management forecasts, and Trueman and Titman (1988) explain how a manager's desire to alter beliefs about default risk can induce the manager to smooth earnings.

Voluntary disclosure models also have the feature that full revelation of information does not occur. Full revelation does not occur because either the manager faces disclosure costs (e.g., Verrecchia 1983; Wagenhofer 1990) or uncertainty exists about whether the manager has private information (e.g., Jung and Kwon 1988). These models differ from ours primarily in that they assume that disclosure is truthful, when it occurs. Thus, these models emphasize the decision to disclose vs. not to disclose, and not bias *per se*.

Finally, "cheap-talk" models originating with Crawford and Sobel (1982) typically show that the receiver of a report cannot back into the sender's information (e.g., Newman and Sansing 1993; Gigler 1994). In these models, there are no implicit reporting standards that form a benchmark for defining misreporting and for imposing misreporting costs. Instead, incentives for the sender to communicate information depend only on the receiver's responses to the sender's reports. Because there are no reporting standards *per se* in cheap-talk models, there is no notion of reporting bias.

III. THE MODEL

Consider a one-period reporting game with a risk-neutral manager of a firm and a perfectly competitive, risk-neutral market. The firm yields a terminal value of $\tilde{v}$, where the manager's and the market's priors for $\tilde{v}$ are normally distributed with mean 0 and variance σ_v^2. During the period, the manager privately observes earnings, $\tilde{e} = \tilde{v} + \tilde{n}$, where it is common knowledge that $\tilde{v}$ and $\tilde{n}$ are independent and $\tilde{n}$ has a normal distribution with mean 0 and variance σ_n^2. After observing the earnings realization, the manager provides an earnings report, r, to the market and the market price is determined. Unlike the manager, the market does not observe the realization of $\tilde{e}$. Consequently, market price is a function of the market's prior beliefs, as well as the manager's earnings report. Because the market is assumed to be perfectly competitive and risk-neutral, the price is the rational expectation of terminal value, $\tilde{v}$, conditioned upon the manager's earnings report, r:

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[3] Another related stream of literature includes papers in the optimal-contracting (i.e., principal-agent) literature that identify conditions under which the revelation principle fails to hold. Obviously, if the revelation principle fails to hold, full disclosure need not occur under any optimal contract. See, for example, the principal-agent model in Dye (1988). For a broad discussion of settings in which the revelation principle fails to hold, see Arya et al. (1998).

$$P = E[\tilde{v}|r]. \tag{1}$$

Earnings can be thought of as the outcome of fundamental economic events coupled with the accounting for those events. The manager is assumed to have some discretion over the accounting for the earnings report and can use that discretion to disclose the observed earnings, $\tilde{e}$, or to report some other number. We interpret the difference between the observed earnings and the number actually reported as the "bias" in the accounting report. Formally, conditional on the manager observing earnings of $\tilde{e} = e$, the earnings report, r, equals $e + b$ where b is the bias the manager introduces into the report. Note that b can be either positive or negative (or zero). When b is positive, we interpret this as the manager "inflating" the report; when b is negative, we interpret this as the manager "deflating" the report.

In choosing a level of bias, the manager attempts to maximize his objective function, which is characterized by the expression:

$$xP - \frac{cb^2}{2}, \tag{2}$$

where $\tilde{x} = x$ is the realization of a random event that the manager alone observes, P is the market price for the firm, c is some known positive parameter, and $cb^2/2$ represents the known cost of bias to the manager. In other words, for a given realization of $\tilde{x} = x$, the manager attempts to maximize xP subject to some cost of using bias as a vehicle to maximize this objective. The term xP captures the benefit to the manager of inducing a marginal change in price by biasing his report.[4] The term $cb^2/2$ captures the cost function, and reflects the manager's litigation risks, psychic costs, or reputation costs of biasing a report. We assume that it is common knowledge that the variable $\tilde{x}$ has a normal distribution with mean μ_x and variance σ_x^2, and that $\tilde{x}$, $\tilde{v}$, and $\tilde{n}$ are jointly independent.[5]

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[4] The discretionary disclosure literature generally assumes managers make disclosure decisions to influence market prices (see, for example, Verrecchia 1983; Jung and Kwon 1988). We employ a similar assumption. Our results continue to hold as long as the manager is attempting to manipulate the expectation of $\tilde{v}$ for some other risk-neutral party (e.g., regulators, labor unions, bankers, or members of the board of directors).

[5] Allowing these parameters to be related does not affect our results in a qualitative sense, but does complicate the analysis. One reason the analysis is complicated is that, when $\tilde{x}$ covaries with $\tilde{v}$ and/or $\tilde{n}$, there can exist up to three linear equilibria. There always exists a linear equilibrium in which price is increasing in the report and, in many cases, this is the unique linear equilibrium. In some cases when *covariance* ($\tilde{x}$, $\tilde{e}$) is positive there exist two equilibria in which price is decreasing in the report, in addition to the one linear equilibrium in which the price is increasing in the report. Finally, in some cases when *covariance* ($\tilde{x}$, $\tilde{e}$) is sufficiently negative and *variance* ($\tilde{e}$)c − *covariance* ($\tilde{x}$, $\tilde{v}$) is positive, there exist three linear equilibria in which price is increasing the report.

Because the manager's uncertain reporting objective is crucial to our model, it is important to provide some motivation for the introduction of uncertainty and for our specific modeling of that uncertainty. At a broad level, the notion that a manager's reporting objective is uncertain seems reasonable because, in real markets, a manager's reporting objective at any point in time is not known precisely. For example, at any point in time, the market does not know: the precise nature of the manager's compensation; the manager's time horizon; the manager's rate of time preference and degree of risk-aversion; the manager's psychic costs associated with bias; the manager's perceptions of litigation risks and reputation costs associated with bias; or the level of effort or resources the manager must expend to achieve a workable bias scheme. Given its inability to discern the manager's precise objective, the market can only conjecture the extent to which the manager has incentives to inflate or deflate expectations. In our model, we formalize this uncertainty by introducing the random variable $\tilde{x}$ into the manager's objective function.

Specifically, we assume that the manager manipulates his report to influence stock price and that the marginal benefit to the manager from shifting price is uncertain. The conventional wisdom in prior work is that managers prefer a higher price; our model is consistent with this objective when x is positive. Note, however, that the realization of $\tilde{x}$ can also assume negative values because $\tilde{x}$ is normally distributed. In these cases, the manager prefers a lower price. This deviation from the conventional wisdom recognizes that there are points in time when a manager can benefit by deflating stock price. For example, a manager who is a large blockholder might deflate price if he intends to hold his shares over the long term and his firm must repurchase shares in the near term to cover employee stock options (e.g., Bill Gates of Microsoft®). Similarly, managers can benefit by driving down price if they intend to engage in a management buyout (see, for example, the evidence in Perry and Williams [1994]). Similarly, a manager who is about to receive a new option grant may attempt to drive down price in order to lower the strike price for options granted (see, for example, the evidence in Aboody and Kasznik 1998). In short, there are times when the conventional wisdom may not hold; our model allows for these possibilities. Finally, even if some managers almost surely have incentives to inflate price at every point in time, the parameters of the distribution can be chosen to reflect this belief by making the probability of a negative realization for $\tilde{x}$ arbitrarily close to 0. This is achieved by assuming that the mean of $\tilde{x}$, μ_x, exceeds the standard deviation of $\tilde{x}$, σ_x, by a large amount.

An equilibrium to the reporting bias game just described consists of a bias function for the manager, $b(e, x)$, and a pricing function for the market, $P(r)$, such that three conditions are satisfied. First, the manager's choice of bias for each realization $\{e, x\}$, $b(e, x)$, must solve his optimization problem given his conjecture as to how the market responds to his report:

$$b(e, x) = \arg\max_b x\hat{P}(r = e + b) - \frac{cb^2}{2}, \tag{3}$$

where $\hat{P}(r = e + b)$ is the manager's conjecture about the market-pricing function. Second, the market price must equal expectation of firm value, $\tilde{v}$, based on a report $r = e + b$ and a conjecture about the bias strategy of each manager type (i.e., the bias choice conditional upon the realizations of $\tilde{e}$ and $\tilde{x}$):

$$P(r) = E[\tilde{v}|r; \hat{b}(e, x)],$$

where $\hat{b}(e, x)$ is the market's conjecture about the manager's bias function. Finally, to constitute a rational expectations equilibrium, both the manager's and the market's conjectures must be rational in the sense that they are fulfilled, that is:

$$\hat{b}(e, x) = b(e, x) \tag{4}$$

for all {e, x} and

$$\hat{P}(r) = P(r) \tag{5}$$

for all r.

IV. A LINEAR EQUILIBRIUM

In this section, we construct an equilibrium to our reporting-bias game. We restrict our analysis to linear equilibria (i.e., price is linear in r and bias is linear in e and x) because they are easily characterized and yield intuition that is compelling.[6] Thus, we conjecture an equilibrium of the form:

$$b(e, x) = \lambda_e e + \lambda_x x + \delta, \tag{6}$$

and

$$P(r) = \beta r + \alpha. \tag{7}$$

We will use the manager's optimization problem and the market-pricing function to prove that there exists a unique linear equilibrium.

The Manager's Problem

To begin, suppose that the manager conjectures that the price of the firm based on a report r is of the form given by equation (7). This implies that, based on a report r, the manager conjectures that the market will set firm value equal to:

$$\begin{aligned} P &= \hat{\beta} r + \hat{\alpha} \\ &= \hat{\beta} e + \hat{\beta} b + \hat{\alpha}, \end{aligned} \tag{8}$$

where, as before, a caret (i.e., "^") denotes a conjecture. The linear conjecture about the pricing function, coupled with the objective function in equation (3), implies that the manager's objective is strictly concave in b. Thus, the manager's optimal bias is given by the first-order condition, which yields:

$$b(e, x) = \frac{\hat{\beta}}{c} x \tag{9}$$

for all {e, x}. Equation (9) implies that the manager's bias is a linear function of the form $b(e, x) = \lambda_e e + \lambda_x x + \delta$, where:

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[6] For the remainder of the paper, the expression equilibrium is used as shorthand for a linear equilibrium.

$$\lambda_e = 0, \quad \lambda_x = \frac{\hat{\beta}}{c}, \quad \text{and} \quad \delta = 0. \tag{10}$$

Because $\lambda_e = 0$ and $\delta = 0$ regardless of the conjecture about the linear-pricing function, we restrict both to 0 for the remaining analysis.

Market Pricing Function

Now we turn to the market pricing function. Assume a conjectured bias function of the form specified by equation (6), where $\hat{\lambda}_e$ and $\hat{\delta}$ equal 0. The market price of the firm is equal to the expectation of the firm's terminal value conditional on the report:

$$\begin{aligned} P &= E[\tilde{v}|r] \\ &= \frac{\sigma_v^2}{\sigma_v^2 + \sigma_n^2 + \hat{\lambda}_x^2\sigma_x^2}(r - \hat{\lambda}_x\mu_x). \end{aligned} \tag{11}$$

Intuitively, equation (11) provides the expression for firm value that results from regressing terminal value, $\tilde{v}$, on reported earnings, r. Equation (11) implies that the market price is a linear function of the report: $P = \beta r + \alpha$ where

$$\beta = \frac{\sigma_v^2}{\sigma_v^2 + \sigma_n^2 + \hat{\lambda}_x^2\sigma_x^2}, \tag{12}$$

and

$$\alpha = -\beta\hat{\lambda}_x\mu_x. \tag{13}$$

The link between the market's beliefs (conjectures) about the extent of reporting bias and value relevance of the earnings report can be explained as follows. Note that the conjectured coefficient on the realization of $\tilde{x}$ in the manager's bias function, $\hat{\lambda}_x$, captures the conjectured extent of bias; for any realization x, the greater the magnitude of $\hat{\lambda}_x$ (i.e., $|\hat{\lambda}_x|$), the greater the magnitude of the bias (i.e., $|b|$). Furthermore, as $|\hat{\lambda}_x|$ becomes larger, more of the variance of reported earnings is attributable to $\tilde{x}$. From the market's perspective, the increase in earnings-report variance attributable to $\tilde{x}$, in turn, causes the earnings report to become a noisier statistic for updating beliefs regarding terminal value, $\tilde{v}$. As a consequence, the value relevance of the earnings report, as captured by the earnings association parameter β, decreases when the market believes that the manager is biasing reports to a greater extent. At the extremes, when the market believes that the manager is not biasing the report, $\hat{\lambda}_x = 0$, the value relevance is maximized (i.e., $\beta = \sigma_v^2/[\sigma_v^2 + \sigma_n^2]$). When the market believes that bias is infinite, $\hat{\lambda}_x \rightarrow \infty$ or $\hat{\lambda}_x \rightarrow -\infty$, the value relevance approaches its lower bound (i.e., $\beta \rightarrow 0$).

The above discussion implies that, in our model, the manager's earnings report would be more value relevant (i.e., less noisy) if the manager did not have the discretion to bias the report. Our model, however, can easily be altered to show how managerial discretion enhances the value relevance of the earnings report.[7] For example, if the incentive parameter, $\tilde{x}$, is negatively correlated with the noise in the earnings observed by the manager, $\tilde{n}$, then the manager's biasing activities tend to offset the noise, resulting in more value-relevant reports. We do not pursue such an alteration in our model because our focus is on settings in which biasing activity reduces the information content of reports.

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[7] For example, Palepu et al. (1997, chap. 3, p. 8) suggest that "When managers can use their accounting flexibility, they can use it either to communicate their firm's economic situation or to hide true performance."

The Unique Linear Equilibrium

The equilibrium requirement that conjectures are self-fulfilling, coupled with the parameter specifications provided by the analysis of the manager's problem and the market pricing function, equations (10), (12), and (13), allow us to characterize the unique linear equilibrium. We do so by replacing the conjectures with the candidate equilibrium values (i.e., eliminating all of the carets over the variables) and then showing that the three equations have a unique solution.

First, replace all of the conjectures in the three equations, and note that equations (10) and (13) imply that λ_e, δ, and α, are all unique functions of λ_x and/or β. To prove the existence of a unique solution, there must exist a unique pair $\{\lambda_x, \beta\}$ that solves equations (10) and (12). From equation (10), it is easy to see that λ_x can be written as a unique function of β. We complete the proof by taking the solution for λ_x derived from equation (10), substituting it in for λ_x in equation (12), and showing that the resulting equation has a unique solution for β:

$$\beta = \frac{\sigma_v^2}{\sigma_v^2 + \sigma_n^2 + \left(\frac{\beta}{c}\right)^2 \sigma_x^2}. \tag{14}$$

Rearranging terms in equation (14) yields the following third-order polynomial equation:

$$\beta^3\sigma_x^2 + \beta(\sigma_v^2 + \sigma_n^2)c^2 - \sigma_v^2 c^2 = 0. \tag{15}$$

Any solution β for equation (15) must be weakly positive (i.e., if β is negative, then the left-hand side is negative). Furthermore, there must exist a unique positive solution because the left-hand side is negative when $\beta = 0$, is monotonically increasing in β, and approaches positive infinity as β approaches positive infinity. Finally, the solution value for β is strictly less than $\sigma_v^2/(\sigma_v^2 + \sigma_n^2)$ because the left-hand side is strictly positive when β equals $\sigma_v^2/(\sigma_v^2 + \sigma_n^2)$. This latter observation is not surprising in that $\beta = \sigma_v^2/(\sigma_v^2 + \sigma_n^2)$ when the manager is constrained to report the earnings he observes (i.e., he cannot bias earnings).

In summary, we have the following proposition.

Proposition 1: There exists a unique linear equilibrium for the reporting game: $P(r) = \beta r + \alpha$ and $b(e, x) = \lambda_e e + \lambda_x x + \delta$, where $\beta \in (0, \sigma_v^2/[\sigma_v^2 + \sigma_n^2])$, $\alpha = -(\beta^2\mu_x/c)$, $\lambda_e = 0$, $\lambda_x = \beta/c$, and $\delta = 0$.

One immediate implication of Proposition 1 is that the uncertainty regarding the manager's incentive to bias reduces the information content of reported earnings, as characterized by the pricing coefficient β, see for example, equation (14). Specifically, in the extreme case where there is no uncertainty regarding the manager's incentives (i.e., $\sigma_x^2 = 0$), β equals $\sigma_v^2/(\sigma_v^2 + \sigma_n^2)$. Note that this value for the coefficient is identical to that attained when the manager is constrained to report the earnings he observes. Thus, in our model, uncertainty about managerial incentives is crucial for managers' biasing activity to affect the value relevance of reported earnings.

V. EMPIRICAL IMPLICATIONS

To highlight the model's insights and empirical implications, we now undertake some comparative static exercises. Before proceeding, however, it is important to clarify our notion of bias. In our model, bias is the *realized* difference between economic earnings and reported earnings. This definition of bias differs from that in the classical statistical sense, where bias is the *expected* difference between economic earnings and reported earnings. This classical, statistical notion of bias is captured in our model by the intercept term in the pricing function, α. Specifically, α is market participants' adjustment for the *expectation* of the difference between the earnings realization and the earnings report, scaled by the market response to marginal changes in the report; that is, $\alpha = -\beta E[b] = -(\beta^2\mu_x/c)$. To contrast these two notions, note that $\mu_x = 0$ implies there is no bias from the statistical (and the market's) perspective because the *expectation* of the difference between economic earnings and reported earnings is 0. On the other hand, bias—as we have defined the term in our paper—is still present because the manager is almost surely reporting earnings that are different from those that he observed. This bias, from the statistical (and the market's) perspective, gives rise to additional noise in earnings.

Regression of Price on Earnings

The association between price and earnings is commonly studied by regressing price on earnings. Our model offers some insights into the determinants of *both* the slope and intercept terms in such a regression because it fits cleanly into a regression framework. In such a regression, the slope coefficient is represented by the earnings association, β, and the intercept is represented by the constant, α. By examining the determinants of both the intercept and slope, we provide predictions about both bias in a classical, statistical sense, as captured by the intercept, and value relevance, as captured by the slope.

Results Concerning the Slope

In models in which the market perfectly backs out any reporting bias, there should be no relation between the value relevance of the report, proxied by the earnings association (or slope), and reporting bias. This occurs because the market perfectly adjusts for reporting bias through the intercept term. In our model, the market does not perfectly back out the bias so we can provide predictions linking the earnings association (i.e., the slope in the regression) to the exogenous determinants of reporting bias: the marginal cost of bias, c, and the uncertainty about the manager's returns to manipulating price, σ_x^2.

Recall that more bias makes the report less informative in our model. Therefore, it is not surprising that the information content of the report (captured by the equilibrium earnings association, β) is increasing in the marginal cost of biasing, c:

$$\frac{d\beta}{dc} = \frac{-2\beta(\sigma_v^2 + \sigma_n^2)c + 2\sigma_v^2 c}{3\beta^2\sigma_x^2 + c^2(\sigma_v^2 + \sigma_n^2)} > 0, \tag{16}$$

because equation (15) requires that $\beta(\sigma_v^2 + \sigma_n^2) - \sigma_v^2 < 0$ in equilibrium. Note that β approaches its lower bound of 0 as c approaches 0 and that β approaches its upper bound of $\sigma_v^2/(\sigma_v^2 + \sigma_n^2)$ as c approaches ∞.

Uncertainty regarding the manager's objective function also affects the relation between bias and the earnings association. Specifically, a comparative static that ties the earnings association, β, to the uncertainty regarding the manager's objective, σ_x^2, is:

$$\frac{d\beta}{d\sigma_x^2} = -\frac{\beta^3}{3\beta^2\sigma_x^2 + c^2(\sigma_v^2 + \sigma_n^2)} < 0. \tag{17}$$

As the uncertainty regarding the manager's objectives increases (as captured by an increase in the variance of $\tilde{x}$), the market places less credence in the report (as reflected in a lower earnings association) because the report provides less precise information regarding the firm's fundamentals. As noted earlier, the earnings association is $\sigma_v^2/(\sigma_v^2 + \sigma_n^2)$ when there is no uncertainty (i.e., $\sigma_x^2 = 0$). In contrast, the earnings association approaches 0 when uncertainty is total (i.e., $\sigma_x^2 \rightarrow \infty$).

The final two exogenous variables we consider have been considered in the prior literature. The first of these is σ_n^2, the inherent quality of the earnings observed by the manager. In the absence of reporting bias, prior literature (e.g., Holthausen and Verrecchia 1988) suggests that the earnings association should be decreasing in σ_n^2 because less noise in reported earnings implies greater earnings association. In our model with reporting bias, however, there is a countervailing force. Specifically, lower earnings association decreases the incentives for reporting bias (i.e., implies a lower value for λ_x). Decreasing the incentives for reporting bias reduces bias, which, in turn, reduces the noise in reported earnings and serves to increase the earnings association. This indirect effect partially offsets the direct effect identified in the prior literature. Nonetheless, the direct effect dominated the indirect effect:

$$\frac{d\beta}{d\sigma_n^2} = -\frac{\beta c^2}{3\beta^2\sigma_x^2 + c^2(\sigma_v^2 + \sigma_n^2)} < 0.$$

The second variable considered in the prior literature is the prior uncertainty regarding the terminal value, σ_v^2. The prior literature (e.g., Holthausen and Verrecchia 1988) again suggests a direct effect of a change in prior uncertainty on the earnings association; the earnings association should be increasing in σ_v^2 because greater noise in prior beliefs implies that new information receives more weight in the posterior expectation. With reporting bias, the indirect effect again provides a countervailing force; if new information receives more weight, incentives to bias—and thus bias—are greater. Nonetheless, the direct effect again dominates the indirect effect:

$$\frac{d\beta}{d\sigma_v^2} = \frac{-\beta c^2 + c^2}{3\beta^2\sigma_x^2 + c^2(\sigma_v^2 + \sigma_n^2)} > 0, \tag{18}$$

because $\beta < 1$ in equilibrium.

Corollary 1 summarizes our results regarding the slope coefficient.

Corollary 1: When price is regressed on earnings, the slope on earnings in the regression, or earnings association, is increasing in the marginal cost of bias, decreasing in the uncertainty regarding the manager's objective, increasing in the quality of the earnings observed by the manager, and increasing in prior uncertainty regarding terminal value: $d\beta/dc > 0$, $d\beta/d\sigma_x^2 < 0$, $d\beta/d\sigma_n^2 < 0$, and $d\beta/d\sigma_v^2 > 0$.

Results on the Intercept

To see how exogenous variables affect the intercept term, first recall that $\alpha = -\beta E[\tilde{b}] = -(\beta^2\mu_x/c)$. Thus, the intercept term is merely the slope times the expected bias in the report. As such it adjusts for the expected amount of bias. When $\mu_x > 0$ (i.e., the likelihood that the manager wants to inflate price exceeds one-half), the intercept term is negative because, on average, the manager biases reported earnings upward; consequently, the adjustment for expected bias is negative. When $\mu_x < 0$ (i.e., the likelihood that the manager wants to inflate price is less than one-half), the intercept term is positive because, on average, the manager biases reported earnings downward.

Throughout our analysis of the intercept term, we assume that $\mu_x > 0$. When $\mu_x < 0$, the comparative static results for the intercept term are the converse of those when $\mu_x > 0$ for all the exogenous variables except μ_x. The comparative static with respect to μ_x is the same in both cases.

We first consider the impact of the marginal cost of bias on the intercept term. The relation between the marginal cost of bias, c, and the intercept term, $\alpha = -(\beta^2\mu_x/c)$, is a function of two countervailing forces. As discussed above, an increase in c increases the association between price and reported earnings, β. This increases the incentives for bias, which drives down the intercept (i.e., a greater adjustment for expected positive bias is needed). On the other hand, an increase in c reduces the incentives for bias because it increases the cost of bias. This reduction in bias increases the intercept term (i.e., a smaller adjustment for expected positive bias is needed). The net of these two forces is generally ambiguous and depends on the magnitude of c. Exploiting the equilibrium conditions, the comparative static relating c to α is:

$$
\begin{aligned}
\frac{d\alpha}{dc} &= -\frac{d\beta}{dc}\frac{2\beta\mu_x}{c} + \frac{\beta^2\mu_x}{c^2} \\
&= -\frac{-2\beta(\sigma_v^2 + \sigma_n^2)c + 2\sigma_v^2 c}{3\beta^2\sigma_x^2 + c^2(\sigma_v^2 + \sigma_n^2)}\frac{2\beta\mu_x}{c} + \frac{\beta^2\mu_x}{c^2} \\
&\propto 3\beta^3\sigma_x^2 + 5\beta(\sigma_v^2 + \sigma_n^2)c^2 - 4\sigma_v^2 c^2 \\
&\propto 2\beta - \frac{\sigma_v^2}{\sigma_v^2 + \sigma_n^2}.
\end{aligned}
\tag{19}
$$

Recall that the equilibrium value for β is between 0 and $\sigma_v^2/(\sigma_v^2 + \sigma_n^2)$. In addition, β is increasing in c, β approaches 0 as c approaches 0, and β approaches $\sigma_v^2/(\sigma_v^2 + \sigma_n^2)$ as c approaches ∞. From these observations, it follows from equation (19) that α is initially decreasing and then subsequently increasing in c when μ_x is positive.

Using Corollary 1, it is a straightforward exercise to show that the remaining comparative statics are unambiguous. Corollary 2 summarizes these results.

Corollary 2: Assume that the manager is more likely to inflate price (i.e., $\mu_x > 0$). The intercept term in a regression of price on earnings, α, is initially decreasing and then subsequently increasing in the marginal cost of bias, increasing in the uncertainty regarding the manager's objective, decreasing in the quality of the earnings observed by the manager, decreasing in prior uncertainty regarding terminal value, and decreasing in the probability that the manager inflates price: $d\alpha/dc > (<) \; 0$ if $c > (<) \; \sigma_x\sigma_v^2/2(\sigma_v^2 + \sigma_n^2)^{3/2}$, $d\alpha/d\sigma_x^2 > 0$, $d\alpha/d\sigma_n^2 > 0$, $d\alpha/d\sigma_v^2 < 0$, and $d\alpha/d\mu_x < 0$.

Intuitive explanations for the unambiguous comparative static results in Corollary 2 are as follows. When the uncertainty regarding the manager's objective, as represented by σ_x^2, increases, the association between price and earnings is smaller. This reduces the manager's incentives for bias, which manifests itself in less positive expected bias. Because there is less positive expected bias, a smaller adjustment is needed to adjust for the positive expected bias. Consequently, the intercept term rises to a value that is closer to 0. Likewise, when the quality of earnings observed by the manager, as represented by σ_n^2, decreases, the earnings association is smaller because there is less information in earnings. This decline induces the manager to bias less, which implies lower positive expected bias. Consequently, the necessary adjustment for that bias is smaller, which makes the intercept term rise to a value that is closer to 0. Similar reasoning also applies when the quality of prior information improves (as represented by a decrease in σ_v^2). Specifically, when σ_v^2 decreases, the earnings association is smaller because earnings conveys *relatively* less information. Consequently, the incentives for bias decrease and a smaller adjustment for expected bias is needed in equilibrium. Finally, when μ_x increases, the magnitude of the adjustment for expected bias increases because the manager has greater incentives to bias (on average).

Determinants of Value Relevance

One measure of value relevance is the earnings association, β. The comparative statics results in Corollary 1 yield insight into the determinants of β. An alternative metric for assessing the information content of reported earnings is the degree of "price efficiency" (i.e., the extent to which price reflects all relevant public and private information). One measure of price efficiency is the variance of terminal value conditional upon the market price, $\mathrm{Var}[\tilde{v}|P]$, divided by the prior variance, σ_v^2. This measure reflects the proportion of uncertainty remaining after the earnings report.

To perform the comparative statics analysis for price efficiency, it is useful to express $\mathrm{Var}[\tilde{v}|P]/\sigma_v^2$ in terms of the model's fundamental parameters:

$$\frac{\mathrm{Var}[\tilde{v}|P]}{\sigma_v^2} = \frac{\mathrm{Var}[\tilde{v}] - \dfrac{\mathrm{Cov}[\tilde{v},\tilde{P}]^2}{\mathrm{Var}[\tilde{P}]}}{\sigma_v^2}$$

$$= \frac{\sigma_v^2 - \dfrac{\sigma_v^4}{\sigma_v^2 + \sigma_n^2 + (\beta/c)^2\sigma_x^2}}{\sigma_v^2}. \qquad (20)$$

Using the equilibrium condition in equation (14) allows equation (20) to be rewritten as:

$$\frac{\mathrm{Var}[\tilde{v}|P]}{\sigma_v^2} = (1 - \beta). \qquad (21)$$

Equation (21) ties price efficiency to earnings association; a higher earnings association (i.e., β) is associated with more efficient prices. From equation (21) it is clear that we can use the comparative statics for the earnings association in Corollary 1 to derive the comparative statics for price efficiency. We summarize the results in Corollary 3.

> **Corollary 3:** Price efficiency is increasing in the marginal cost of bias, decreasing in the uncertainty regarding the manager's objective function, increasing in the quality of the earnings observed by the manager, and decreasing in the prior uncertainty regarding terminal value: $d(\mathrm{Var}[\tilde{v}|P]/\sigma_v^2)/dc < 0$, $d(\mathrm{Var}[\tilde{v}|P]/\sigma_v^2)/d\sigma_x^2 > 0$, $d(\mathrm{Var}[\tilde{v}|P]/\sigma_v^2)/d\sigma_n^2 > 0$, and $d(\mathrm{Var}[\tilde{v}|P]/\sigma_v^2)/d\sigma_v^2 < 0$.

Corollaries 1 and 3 provide a number of insights pertaining to value relevance. First, they offer some theoretical support for the claim that greater enforcement of disclosure regulations, or stiffer penalties for violations of those regulations (as represented by an increase in c) increase the value relevance of firm disclosures. In addition, they suggest that greater disclosure abut manager's objectives (e.g., managerial incentive plans) that reduces σ_x^2 may, in turn, result in more value-relevant reports. Note that this increase in value relevance does not arise because the disclosure provides information about compensation expense. Rather, the increase in value relevance arises because the disclosure increases the user's *understanding* of the manager's incentives to bias the report.

Expected Bias

Expected bias in reports is the final metric we examine. Recall that the manager's choice of bias is $b = (\beta/c)x$. This implies that:

$$E[\tilde{b}] = \frac{\beta}{c} E[\tilde{x}] = \frac{\beta}{c} \mu_x. \tag{22}$$

If, on average, there are greater incentives for managers to inflate current price, then $\mu_x > 0$ and expected bias is increasing in the earnings association. Conversely, if, on average, there are greater incentives for managers to deflate current price, then $\mu_x < 0$ and the expected bias is decreasing in the earnings association. For the remainder of our analysis of expected bias, we assume that the manager, on average, has greater incentives to inflate price (i.e., $\mu_x > 0$). Analogous results hold in the converse case.

Corollary 4 summarizes comparative static results on expected bias.

> **Corollary 4:** Assume that the manager is more likely to inflate price (i.e., $\mu_x > 0$). Expected bias is decreasing in the marginal cost of bias, decreasing in the uncertainty regarding the manager's objective, increasing in the quality of the earnings observed by the manager, increasing in prior uncertainty regarding terminal value, and increasing in the probability that the manager inflates price: $dE[\tilde{b}]/dc < 0$, $dE[\tilde{b}]/d\sigma_x^2 < 0$, $dE[\tilde{b}]/d\sigma_n^2 < 0$, $dE[\tilde{b}]/d\sigma_v^2 > 0$, and $dE[\tilde{b}]/d\mu_x > 0$.

With regard to the first comparative static, note that:

$$\frac{dE[\tilde{b}]}{dc} = -\frac{\beta\mu_x}{c^2} + \frac{\mu_x}{c}\frac{d\beta}{dc} = -\frac{\mu_x}{c^2}\,\frac{3\beta^3\sigma_x^2 + 3\beta(\sigma_v^2 + \sigma_n^2)c^2 - 2\sigma_v^2c^2}{3\beta^2\sigma_x^2 + c^2(\sigma_v^2 + \sigma_n^2)} < 0. \tag{23}$$

Because $d\beta/dc > 0$, the sign of this comparative static might appear to be ambiguous.

This is because the direct effect of an increase in the marginal cost of bias, $-(\beta/c^2)\mu_x < 0$, is countered by the indirect effect of an increase in the price association with earnings, $(\mu_x/c)(d\beta/dc) > 0$. As is shown, however, the direct effect always dominates because the equilibrium condition for β, equation (15), implies that $3\beta^3\sigma_x^2 + 3\beta(\sigma_v^2 + \sigma_n^2)c^2 - 2\sigma_v^2c^2 = \sigma_v^2c^2 > 0$. The second, third, and fourth comparative statics follow directly from the effect of the variable on the earnings association, β (see Corollary 1). The last comparative static arises because an increase in μ_x is associated with an increase in the manager's average incentives to bias reported earnings upward. Consequently, an increase in μ_x leads to more expected bias in equilibrium.

VI. MANAGERIAL BENEFITS FROM REPORTING BIAS

The introduction explained that many models with reporting bias suggest that the ability to bias the report does not make the manager better off. This outcome arises because these models assume: (1) the market has rational expectations, and (2) the market has perfect knowledge of the manager's reporting objective (i.e., optimization problem). In the presence of these two assumptions, the market perfectly backs out the bias in equilibrium. Consequently, in equilibrium, the manager's bias does not successfully "fool" anyone. Furthermore, because bias is costly, the manager bears some cost. Thus, the manager is worse off as a result of being able to bias his report. Because our setting relaxes the assumption that the market knows the manager's reporting objective, we reconsider whether the manager's ability to bias his report renders him worse off.

We first consider the manager's welfare from an *ex ante* perspective by analyzing his welfare before the realization of $\tilde{x}$ and $\tilde{e}$. Second, we analyze the manager's *ex post* welfare conditional on the realization of $\tilde{x}$ (but not $\tilde{e}$). In both cases, we demonstrate that the manager may be better off with the option to bias. Thus, in contrast to the prior literature, our model suggests that the manager is not necessarily made worse off with the option to bias.

The *Ex Ante* Value of Bias

Using the equilibrium condition that $b = x(\beta/c)$, we can express the *ex ante* value of the manager's objective function as:

$$E\left[\tilde{x}(\beta(\tilde{e} + \tilde{b}) + \alpha) - \frac{c\tilde{b}^2}{2}\right] = \frac{\beta^2}{2c}(\sigma_x^2 - \mu_x^2). \tag{24}$$

In contrast, if the manager has no option to bias (i.e., b is restricted to 0), his *ex ante* expected utility is given by:

$$E\left[\tilde{x}\,\frac{\sigma_v^2}{\sigma_v^2 + \sigma_n^2}\,\tilde{e}\right] = 0. \tag{25}$$

Thus, it follows from equations (24) and (25) that the manager is better off when he has the option to bias whenever $(\beta^2/2c)(\sigma_x^2 - \mu_x^2) > 0$, or, equivalently, whenever:

$$\sigma_x^2 - \mu_x^2 > 0. \tag{26}$$

Equation (26) has an interesting economic interpretation. Think of a value of $\sigma_x^2 - \mu_x^2$ as capturing the uncertainty about whether the manager will try to inflate or deflate price. Specifically, when σ_x^2 is large or when μ_x is close to 0, the probability that the manager will inflate his report (and the price) and the probability that he will deflate his report (and the price) move closer together (i.e., each probability approaches one-half). With this interpretation, equation (26) suggests that when *ex ante* uncertainty about types is large (σ_x^2 is large or μ_x is close to 0), the manager is better off with the option to bias. Alternatively, when the uncertainty is small (σ_x^2 is small or μ_x is far from 0), he is worse off with the option to bias. We formalize this discussion with the following corollary.

> **Corollary 5:** The *ex ante* net benefit to the manager from biasing the report is positive if there is sufficient uncertainty as to whether the manager inflates or deflates price; that is, the *ex ante* benefit to the manager from biasing reports assumes a strictly positive value if, and only if, $\sigma_x^2 - \mu_x^2 > 0$.

To offer some intuition for Corollary 5, note that the manager sometimes wants to induce a price that is too high ($x > 0$) and sometimes wants to induce a price that is too low ($x < 0$). In a sense, these different types of realizations create a positive externality for each other. The fact that the manager sometimes wants to induce a lower price, $x < 0$, allows the manager to achieve a higher price in a more cost-efficient manner when $x > 0$. This occurs because investors do not perfectly adjust for the manager's bias through the intercept term in the price function.

When the probability that the manager wants to induce a higher price is sufficiently close to the probability the manager wants to induce a lower price (i.e., σ_x^2 is large or μ_x is close to 0), the intercept term is small in magnitude because investors are highly uncertain as to whether the manager is attempting to induce a price that is too high or a price that is too low. This small intercept term makes the *ex ante* returns to biasing behavior positive. On the other hand, when the manager almost always desires a higher or lower price (i.e., σ_x^2 is small or μ_x is far from 0), the intercept term becomes large in magnitude, which makes the *ex ante* returns to biasing behavior negative. Thus, if one believes the manager only wants to bias price upward ($\mu_x > 0$ and $\sigma_x^2 = 0$), then our model yields the standard outcome.

Finally, the fact that managers may benefit *ex ante* from biasing reports should not be interpreted as suggesting that some other parties lose *ex ante*. The only other parties in the model are risk-neutral investors and they do not lose *ex ante* because price is equal to their (rational) expectation of firm value based on what is reported. In effect, managers can benefit *ex ante* because the game is not structured as a zero sum game.

The *Ex Post* Value of Bias

Our analysis of *ex post* manager welfare addresses the following question: for what realizations of $\tilde{x}$ does the option to bias make the manager better off? Using the equilibrium condition that $b = x(\beta/c)$, the manager's expected utility conditional upon the realization x can be written as:

$$E\left[\tilde{x}(\beta(\tilde{e} + \tilde{b}) + \alpha) - \frac{c\tilde{b}^2}{2} \middle| \tilde{x} = x\right] = \frac{\beta^2}{2c}\left[(x - \mu_x)^2 - \mu_x^2\right]. \tag{27}$$

In contrast, when the manager cannot bias (b is restricted to 0), the manager's expected utility conditional upon the realization of x is given by:

$$E\left[\tilde{x}\,\frac{\sigma_v^2}{\sigma_v^2 + \sigma_n^2}\,\tilde{e}\middle|\tilde{x} = x\right] = 0. \tag{28}$$

It follows from equations (27) and (28) that the manager is better off with the option to bias if:

$$(x - \mu_x)^2 - \mu_x^2 > 0. \tag{29}$$

Equation (29) implies that the manager is better off with the option to bias when the realization x is sufficiently far from expectations. The intuition underlying this result is that the manager is better off with the option to bias in those states where he has a high marginal return to manipulating the market price. This leads to the following corollary.

Corollary 6: The *ex post* net benefit to the manager from biasing the report is positive if his marginal benefit from manipulating price is large; that is, the manager is better off in a setting where he has the option to bias if and only if $(x - \mu_x)^2 - \mu_x^2 > 0$.

Note that the manager benefits for all state realizations of x in the special case in which $\mu_x = 0$. The reason for this is that $\mu_x = 0$ implies that the intercept term in the pricing function is 0. For example, the positive bias of, say 10, in x's report is offset by the negative bias of -10 in $-x$'s report because the probability density for x equals the probability density for $-x$.

VII. SUMMARY

In this paper we develop a parsimonious model that explains how managers' reporting bias can be value relevant. The key to our model is the relaxation of the assumption that the market (perfectly) knows the manager's reporting objective. Upon relaxing this assumption, we find that bias in the manager's report reduces the value relevance, or the information content, of the report. The model yields comparative statics that provide insight into factors that affect the slope and intercept terms in a regression of price on earnings. For example, we show that the information content of the manager's report, as captured by the earnings slope coefficient, falls as the private cost to the manager of biasing reports falls, and as the uncertainty about the manager's objective increases. In addition, we show that the magnitude of the adjustment for the expected amount of bias, as captured by the absolute value of the intercept, falls as the uncertainty about the manager's objective increases. In contrast with other models of reporting where investors can perfectly adjust for the manager's bias, we also demonstrate that when the market cannot perfectly adjust, the manager may be strictly better off with the option to bias.

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BOOK REVIEWS

Jane L. Reimers, Editor

Editor's Note: The year 2000 is a good time to reflect on the books or monographs that have influenced research in accounting during the past 50 or 60 years. I have invited a small number of leading scholars in accounting to select a work that has been influential in the development of their academic careers and to provide a brief review of that book or monograph. This issue features the reviews of Joel S. Demski and Nicholas Dopuch. Special thanks to these outstanding scholars who have done so much for all dimensions of our profession—teaching, research, and service. I believe you will find their reviews that follow, like all of their contributions, both interesting and thought-provoking.

GERARD DEBREU, *Theory of Value: An Axiomatic Analysis of Economic Equilibrium* (New Haven, CT: Yale University Press, 1993, 114, $13). (Originally published in 1959, copyright renewed in 1983–xi.)

Professor Reimers' invitation to single out an important work that has heavily influenced my thinking and stood the test of time is a welcome opportunity to acknowledge (partially) my intellectual debts. My choice, Debreu's monograph, provides an abstract, axiomatic analysis of general equilibrium. Following some mathematical preliminaries, it works through the formal notions of economic commodities and market structure, producer behavior, consumer behavior, and the existence of equilibrium. From here the fundamental theorems of welfare analysis are developed; the study concludes with an extension to uncertainty.

This is not a novel, and the technical details are not easily consumed in a single, casual reading. But the payoff to multiple readings is enormous and wide-ranging. As a lesson in academic life, the sheer elegance of the work is astounding. Indeed, the monograph remains, to this day, my standard for elegance. A second, immediate lesson in academic life is the power of abstraction—properly placed—to be clarifying. My own struggles through the years to understand accounting institutions have been heavily influenced by the expansive, coherent, interactive view of economic life abstractly portrayed in Debreu's monograph. (And don't miss the lesson in how to title your work.)

The lessons for accounting scholarship are multiple, and still coming into view. For example, activity-based costing popularized the notion of nonvolume cost drivers. What we learn in Debreu is the profound subtlety of what is meant by a commodity and by a perfect and complete set of markets. Products produced at different times (e.g., in different runs) are simply different products; and nonvolume drivers surface, in theory, because of errors introduced by aggregating different products.

Another accounting illustration is our notion of fair value and the ever-present issue of how to "value" some particular asset or liability. In a general equilibrium context, though, value is simply an equilibrium notion, an equilibrium price vector defined on the commodity space, so to speak. Notice Professor Debreu's lack of adjective here. The tight linkage between market structure and economic value is the very essence of this monograph—a linkage that we, in accounting, routinely gloss over.

Similarly, accounting thought is almost always a partial equilibrium story: the firm is using derivatives, the firm has a problematic liability, the firm is reconstituting itself via merger, etc. We then ask how best to record these activities in the financial records. Yet the antidote to our continued thinking in these terms is a larger notion of equilibrium. For example, if a reporting standard is introduced, what might an economy-wide perspective entail? Likewise, to better understand a reporting issue, I find it useful to step back and try to envision a setting where that issue *per se* is endogenous. Surely we proceed in partial equilibrium mode; but equally certain is the importance of taxing ourselves to better understand what a more comprehensive analysis would embrace.

Though developments have moved on in important directions (e.g., incentive compatibility and nonconvexity issues), Debreu's monograph remains, in my mind, a compelling—indeed essential—stepping stone in accounting scholarship. Moreover, as our scholarship has become more specialized by topic and method, and trade between "camps" has become more friction-laden, it strikes me as all the more important that we step back and work through what it means to think about an entire economy, and to place accounting as a viable activity in that economy. This is, after all, our heritage.

Debreu's monograph is not just for the analytic types, not just for the financial types, and not just for those with a taste for the abstract. It is a challenge to stretch our thinking, a challenge offered to us all.

JOEL S. DEMSKI
Frederick E. Fisher Eminent Scholar at the Fisher
School of Accounting

University of Florida

W. A. PATON AND A. C. LITTLETON, *An Introduction to Corporate Accounting Standards*, Monograph No. 3 (Sarasota, FL: American Accounting Association, 1940, 156, $10 [members], $15 [nonmembers]).

I first read the Paton and Littleton monograph in 1958 while a graduate student at the University of Illinois. Several of the faculty on the staff at that time knew A. C. Littleton personally, and in one of the courses taught by C. T. Moyer, we students became privy to various bits of correspondence exchanged between Paton and Littleton as they labored over their work. I was, and still am, amazed by the fact that these two academics could successfully complete one of the more lasting literary works in accounting given that they sometimes had widely different views about the proper measurement basis in accounting.

I do not recall reading anything written by Littleton in which he advocated a departure from a historical cost basis of accounting measurements. The most he would concede was to include other measures, such as replacement costs, price-level adjusted costs, or even exit (market) values, as supplementary information provided outside the traditional financial accounting statements. In contrast, Paton began and ended his accounting career as a strong supporter of the use of replacement costs. His faith in the use of replacement costs as the basis for accounting measurements was shaken by the depression, and he agreed with Littleton at the time of their cooperative effort that estimates of current values be reported only in supplementary statements (see Chapter VII). However, Paton did not remain a lasting convert to historical costs, reverting to his preferred role as a supporter of replacement costs following the rising rates of inflation after World War II.[1]

Paton's acceptance of the historical cost basis allowed the authors to develop their monograph along one major theme—the relative desirability of historical costs over current values as the primary measurement basis in financial accounting. Their adherence to this theme was remarkable and perhaps too extreme for some. For example, the popular "lower of cost or market" rule for inventories was rejected because it anticipated a loss before it had been realized (p. 127). The LIFO inventory method was also rejected, this time because the method rests on an unrealistic assumption of how costs (and physical units) flow through the operations of the typical firm (p. 79).

Whether one agrees or disagrees with their views, the consistency with which Paton and Littleton followed the historical cost theme helped establish their monograph as the most authoritative defense of historical costs and the basic framework for financial accounting measurements. The monograph certainly influenced my thinking, especially when the historical cost basis was attacked from several different directions during the early 1960s—e.g., the Moonitz-Sprouse (Edwards-Bell) pleas for current costs and Chamber's urging of the adoption of exit price accounting. I do not doubt the usefulness of current costs to management when planning and evaluating the uses of scarce resources or the relevance of current market prices on decisions of whether to hold or sell assets (retire debt). However, based on my exposure to the monograph the first question that enters my mind when I hear arguments for the use of current costs or exit prices in financial accounting is whether active competitive markets exist to generate credible estimates of either of these constructs. This question is raised repeatedly in the monograph, and the general reply is that such markets rarely exist for firms' nonliquid assets (liabilities). I tend to agree.

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[1] See Stephen A. Zeff (1979), "Paton on the Effects of Changing Prices on Accounting, 1916–55," in *Essays in Honor of William A. Paton*, edited by S. A. Zeff, J. Demski, and N. Dopuch (Division of Research, Graduate School of Business Administration, University of Michigan).

NICHOLAS DOPUCH
Herbert C. & Dorothy R. Moog Professor of
Accounting, Olin School of Business

Washington University

Editorial Data

Manuscripts submitted to *The Accounting Review* are assigned one or two reviewers. The following table contains information about turnaround time for reviewed manuscripts for the 12-month period ended November 30, 1999. Turnaround time is the number of days between the date of the editor's letter to the author(s) and the date that the manuscript and submission fee were received:

	Number of Manuscripts	Cumulative Number	Cumulative Percent
0 ≤ Days ≤ 30	20	20	8.81
31 ≤ Days ≤ 60	68	88	38.77
61 ≤ Days ≤ 90	85	173	76.21
91 ≤ Days ≤ 120	52	225	99.12
≥ 121 Days	2	227	100.00

The mean turnaround time was 67 days; the median turnaround time was 71 days. A limited number of manuscripts are returned without review and such manuscripts are excluded from the turnaround time statistics reported above.

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The following faculty have graciously donated their time and expertise to assist in evaluating manuscripts for *The Accounting Review* between June 1998 and May 1999. Their support is greatly appreciated—*The Editor.*

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EDITORIAL POLICY AND STYLE INFORMATION

EDITORIAL POLICY

According to the policies set by the Publications Committee (which were endorsed by the Executive Committee and were published in the *Accounting Education News*, June 1987), *The Accounting Review* "should be viewed as the premier journal for publishing articles reporting the results of accounting research and explaining and illustrating related research methodology. The scope of acceptable articles should embrace any research methodology and any accounting-related subject, as long as the articles meet the standards established for publication in the journal....No special sections should be necessary. The primary, but not exclusive, audience should be—as it is now—academicians, graduate students, and others interested in accounting research."

The primary criterion for publication in *The Accounting Review* is the significance of the contribution an article makes to the literature.

The efficiency and effectiveness of the editorial review process is critically dependent upon the actions of both authors submitting papers and the reviewers. Authors accept the responsibility of preparing research papers at a level suitable for evaluation by independent reviewers. Such preparation, therefore, should include subjecting the manuscript to critique by colleagues and others and revising it accordingly prior to submission. The review process is not to be used as a means of obtaining feedback at early stages of developing the research.

Reviewers and associate editors are responsible for providing critically constructive and prompt evaluations of submitted research papers based on the significance of their contribution and on the rigor of analysis and presentation. Associate editors also make editorial recommendations to the editor.

MANUSCRIPT PREPARATION AND STYLE

The Accounting Review's manuscript preparation guidelines follow (with a sight modification) the B-format of *The Chicago Manual of Style* (14th ed.; University of Chicago Press). Another helpful guide to usage and style is *The Elements of Style*, by William Strunk, Jr., and E. B. White (Macmillan). Spelling follows *Webster's International Dictionary*.

FORMAT

1. All manuscripts should be typed in 12-point font on one side of 8½ × 11" good quality paper and be double spaced, except for indented quotations.
2. Manuscripts should be as concise as the subject and research method permit, generally not to exceed 7,000 words.
3. Margins of at least one inch from top, bottom, and sides should facilitate editing and duplication.
4. To promote anonymous review, authors should not identify themselves directly or indirectly in their papers or in experimental test instruments included with the submission. Single authors should not use the editorial "we."
5. A cover page should show the title of the paper, the author's name, title and affiliation, email address, any acknowledgments, and a footnote indicating whether the author would be willing to share the data (see last paragraph in this statement).

Pagination: All pages, including tables, appendices and references, should be serially numbered. Major sections should be numbered in Roman numerals. Subsections should not be numbered.

Numbers: Spell out numbers from one to ten, except when used in tables and lists, and when used with mathematical, statistical, scientific, or technical units and quantities, such as distances, weights and measures. For example: *three days; 3 kilometers; 30 years.* All other numbers are expressed numerically.

Percentages and Decimal Fractions: In nontechnical copy use the word percent in the text.

Hyphens: Use a hyphen to join unit modifiers or to clarify usage. For example: *a well-presented analysis; re-form.* See *Webster's* for correct usage.

Key Words: The abstract is to be followed by four key words that will assist in indexing the paper.

ABSTRACT/INTRODUCTION

An Abstract of about 100 words should be presented on a separate page immediately preceding the text. The Abstract should concisely inform the reader of the manuscript's topic, its methods, and its findings.

Key Words and the Data Availability statements should follow the Abstract. The text of the paper should start with a section labeled "I. Introduction," which provides more details about the paper's purpose, motivation, methodology, and findings. Both the Abstract and the introduction should be relatively nontechnical, yet clear enough for an informed reader to understand the manuscript's contribution. The manuscript's title, but neither the author's name nor other identification designations, should appear on the Abstract page.

TABLES AND FIGURES

The author should note the following general requirements:

1. Each table and figure (graphic) should appear on a separate page and should be placed at the end of the text. Each should bear an Arabic number and a complete title indicating the exact contents of the table or figure. Tables and figures should define each variable. The titles and definitions should be sufficiently detailed to enable the reader to interpret the tables and figures without reference to the text.
2. A reference to each graphic should be made in the text.
3. The author should indicate by marginal notation where each graphic should be inserted in the text.
4. Graphics should be reasonably interpreted without reference to the text.
5. Source lines and notes should be included as necessary.

Equations: Equations should be numbered in parentheses flush with the right-hand margin.

DOCUMENTATION

Citations: Work cited should use the "author-date system" keyed to a list of works in the reference list (see below). Authors should make an effort to include the relevant page numbers in the cited works.

1. In the text, works are cited as follows: authors' last name and date, without comma, in parentheses: for example, (Jones 1987); with two authors: (Jones and Freeman 1973); with more than two: (Jones et al. 1985); with more than one source cited together (Jones 1987; Freeman 1986); with two or more works by one author: (Jones 1985, 1987).
2. Unless confusion would result, do not use "p." or "pp." before page numbers: for example, (Jones 1987, 115).
3. When the reference list contains more than one work of an author published in the same year, the suffix a, b, etc. follows the date in the text citation: for example, (Jones 1987a) or (Jones 1987a; Freeman 1985b).
4. If an author's name is mentioned in the text, it need not be repeated in the citation; for example, "Jones (1987, 115) says...."
5. Citations to institutional works should use acronyms or short titles where practicable; for example, (AAA ASOBAT 1966); (AICPA Cohen Commission Report 1977). Where brief, the full title of an institutional work might be shown in a citation: for example, (ICAEW *The Corporate Report* 1975).
6. If the manuscript refers to statutes, legal treatises or court cases, citations acceptable in law reviews should be used.

Reference List: Every manuscript must include a list of references containing only those works cited. Each entry should contain all data necessary for unambiguous identification. With the author-date system, use the following format recommended by *The Chicago Manual*:

1. Arrange citations in alphabetical order according to surname of the first author or the name of the institution responsible for the citation.
2. Use author's initials instead of proper names.
3. Date of publication should be placed immediately after author's name.
4. Titles of journals should not be abbreviated.
5. Multiple works by the same author(s) in the same year are distinguished by letters after the date.
6. Inclusive page numbers are treated as recommended in *Chicago Manual* section 8.67.

Sample entries are as follows:

American Accounting Association, Committee on Concepts and Standards for External Financial Reports. 1977. *Statement on Accounting Theory and Theory Acceptance*. Sarasota, FL: AAA.

Demski, J. S., and D. E. M. Sappington. 1989. Hierarchical structure and responsibility accounting. *Journal of Accounting Research* 27 (Spring): 40–58.

Dye, R., B. Balachandran, and R. Magee. 1989. Contingent fees for audit firms. Working paper, Northwestern University, Evanston, IL.

Fabozzi, F., and I. Pollack, eds. 1987. *The Handbook of Fixed Income Securities*. 2nd edition. Homewood, IL: Dow Jones-Irwin.

Kahneman, D., P. Slovic, and A. Tversky, eds. 1982. *Judgment Under Uncertainty: Heuristics and Biases*. Cambridge, U.K.: Cambridge University Press.

Porcano, T. M. 1984a. Distributive justice and tax policy. *The Accounting Review* 59 (October): 619–636.

———. 1984b. The perceived effects of tax policy on corporate investment intentions. *The Journal of the American Taxation Association* 6 (Fall): 7–19.

Shaw, W. H. 1985. Empirical evidence on the market impact of the safe harbor leasing law. Ph.D. dissertation, University of Texas at Austin.

Sherman, T. M., ed. 1984. *Conceptual Framework for Financial Accounting*. Cambridge, MA: Harvard Business School.

Footnotes: Footnotes are not used for documentation. Textual footnotes should be used only for extensions and useful excursions of information that if included in the body of the text might disrupt its continuity. Footnotes should be consecutively numbered throughout the manuscript with superscript Arabic numerals. Footnote text should be doubled-spaced and placed at the end of the article.

SUBMISSION OF MANUSCRIPTS

Authors should note the following guidelines for submitting manuscripts:

1. Manuscripts currently under consideration by another journal or publisher should not be submitted. The author must state that the work is not submitted or published elsewhere.
2. In the case of manuscripts reporting on field surveys or experiments, four copies of the instrument (questionnaire, case, interview plan or the like) should be submitted. Information that might identify the author(s) must be deleted from the instrument.
3. Four copies should be submitted together with a check in U.S. funds for $75.00 for members or $100.00 for nonmembers of the AAA made payable to the American Accounting Association. Effective January 1990, the submission fee is nonrefundable.
4. The author should retain a copy of the paper.
5. Revisions must be submitted within 12 months from request, otherwise they will be considered new submissions.

COMMENTS

Comments on articles previously published in *The Accounting Review* will be reviewed (anonymously) by two reviewers in sequence. The first reviewer will be the author of the original article being subjected to critique. If substance permits, a suitably revised comment will be sent to a second reviewer to determine its publishability in *The Accounting Review*. If a comment is accepted for publication, the original author will be invited to reply. All other editorial requirements, as enumerated above, also apply to proposed comments.

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Written application must be made to the American Accounting Association, 5717 Bessie Drive, Sarasota, FL 34233-2399, for permission to reproduce any of the contents of the *Review* for use in other than courses of instruction—e.g., inclusion in books of readings or in any other publications intended for general distribution. In consideration for the grant of permission by the *Review* in such instances, the applicant must notify the author(s) in writing of the intended use to be made of each reproduction. Normally, the *Review* will not assess a charge for the waiver of copyright.

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POLICY ON DATA AVAILABILITY

The following policy has been adopted by the Executive Committee in its April 1989 meeting.

"An objective of (*The Accounting Review, Accounting Horizons, Issues in Accounting Education*) is to provide the widest possible dissemination of knowledge based on systematic scholarly inquiries into accounting as a field of professional research, and educational activity. As part of this process, authors are encouraged to make their data available for use by others in extending or replicating results reported in their articles. Authors of articles which report data dependent results should footnote the status of data availability and, when pertinent, this should be accompanied by information on how the data may be obtained."

APRIL 2000 PLACEMENT ADS

*The deadline for information to be included in the "Placement Information" section is two months prior to the date of publication. The **Review** is published on the first day of January, April, July and October. Placement advertising and replies should be sent to the American Accounting Association, 5717 Bessie Drive, Sarasota, FL 34233-2399, ATTENTION: ADVERTISING DEPT. All replies to box numbers should be on separate sheets to facilitate forwarding.*

201 STATE UNIVERSITY OF NEW YORK AT BUFFALO (SUNYAB), School of Management, has two September 2000 openings for an Assistant, Associate, or Full Professor of Accounting. Candidates should have teaching and research interests in Financial Accounting, Managerial Accounting, and/or Auditing, and demonstrated capacity to undertake scholarly research publishable in leading journals. Candidates with aptitude for quality teaching in M.B.A. and executive M.B.A. programs preferred; teaching opportunities also available at undergraduate and Ph.D. levels. Doctorate in hand or (at the Assistant level) near completion from a reputable research university expected. Research record a requirement for senior positions. Salary and fringe benefits are competitive. Send resume, two letters of recommendation, copy of dissertation proposal, and/or other research paper(s) to Professor Susan Hamlen, Department of Accounting & Law, Jacobs Management Center, State University of New York at Buffalo, Buffalo, NY 14260-4000; Fax: (716) 645-3823; Email: hamlen@acsu.buffalo.edu. SUNYAB is an Affirmative Action/Equal Opportunity Employer.

202 ANGELO STATE UNIVERSITY invites applications for a tenure-track position at the Assistant or Associate Professor level. The salary range is $46,538–$53,712, and summer school is usually available at one-sixth of the nine-month salary. Applicants must have a doctorate and professional certification is desirable. The twelve-hour per semester load will include one graduate course in Financial Statement Analysis and several sections of Principles of Accounting with ability in Systems desirable. Applications should consist of a cover letter, current resume, teaching evaluations, and the names, addresses, and phone numbers of three references familiar with teaching ability. Additional information about the department is available at http://www.angelo.edu/dept/aef. Review of applications will begin January 14, 2000, and continue until the position is filled. Contact: Dr. Norman A. Sunderman, Head, Department of Accounting, Economics, and Finance, Angelo State University, San Angelo, TX 76909; Fax: (915) 942-2285; Email: Norman.Sunderman@angelo.edu. Angelo State University is an Equal Opportunity/Affirmative Action Employer.

203 UNIVERSITY OF OKLAHOMA, School of Accounting, invites applications for the Dale Looper Chair, intended to support integration of current accounting practice into the academic curriculum. Since the holder is expected to maintain a professional practice, the faculty appointment may be full-time or part-time, but not less than half-time. Qualifications include the following: (1) Candidates with an academic background should possess an earned doctorate and qualify for a tenured appointment; (2) Candidates with a business background should have significant professional experience; (3) All candidates should hold a CPA certificate and have an active professional practice; and (4) Evidence of excellent teaching is expected of all candidates. Preferred starting date is 8/16/2000. Screening of applications will begin 2/1/2000. Apply to Louis Ederington, Associate Dean, Michael F. Price College of Business, University of Oklahoma, Norman, OK 73019-4004; Phone: (405) 325-5591. University of Oklahoma is an Equal Opportunity Employer and is responsive to the needs of dual-career couples.

204 LONG ISLAND UNIVERSITY, School of Business, Public Administration and Information Sciences, at the Brooklyn Campus invites applications for an Assistant Professor, tenure-track, to begin fall 2000. The candidate will teach undergrad and grad courses in Intermediate, Management, and Advanced Accounting. Knowledge of Accounting Applications desired. Ph.D. or ABD and CPA required. Professional experience preferred. The Brooklyn Campus, occupying a ten-acre site in downtown Brooklyn, is one of the country's most dynamic and diverse urban campuses serving students in day, evening, and weekend programs. It enrolls more than 8,000 students in over 52 graduate and 62 undergraduate degree programs. Long Island University is the nation's eighth largest private university with six campuses in metropolitan New York and Long Island. Send letter of interest, *curriculum vitae*, and three letters of reference to Professor Ben Lee, Chair, Search Committee, Dept. Accounting, Taxation and Law, Long Island University, 1 University Plaza, Brooklyn, NY 11201-8423; or Fax (718) 488-1125. Search will remain open until position filled. AA/OEE.

205 UNIVERSITY OF MINNESOTA, DULUTH invites applications for a tenure-track, full-time, 9-month, Assistant/Associate Professor position to begin 9/1/00. Doctoral degree in hand at time of appointment in Accounting or (Ph.D. or D.B.A.) in Business Administration with a concentration in Accounting from an AACSB-accredited institution; college-level teaching experience; appropriate education or experience to develop and teach Accounting Information Systems, Cost and Financial courses; a publication record in accounting refereed academic journals or peer-reviewed proceedings; and communication skills appropriate to a faculty position in Accounting are required. CPA/CMA certification and college-level teaching experience in Accounting preferred. Completed applications will be reviewed beginning January 15, 2000 and will continue until the position is filled. Applicants must submit a letter of application; *curriculum vitae*; listing of published research papers; and names, addresses, and phone numbers of three references to Dr. Rodger L. Brannan, Department of Accounting, University of Minnesota, Duluth, 125 School of Business and Economics, 10 University Drive, Duluth, MN 55812-2496; Phone: (218) 726-8566; Email: rbrannan@d.umn.edu; Fax: (218) 726-8510. The University of Minnesota is an Equal Opportunity Educator and Employer.

206 DAEMEN COLLEGE in Amherst, New York, has an Accounting, tenure-track position available immediately. Applicants must have a strong interest in teaching undergraduate students in a small, high-quality program. Rank/salary dependent on applicants' qualifications/experience. CPA plus Ph.D. or D.B.A. or J.D. required (ABD considered). For consideration, send resume, letter of application and three references to Daemen College, Personnel Dept., 4380 Main St., Amherst, NY 14226. Review of applicants begins immediately and continues until a qualified candidate is identified. AA/EOE.

207 DUKE UNIVERSITY, Fuqua School of Business, is seeking highly qualified Accounting faculty at all levels. The qualifications required include a demonstrated interest in and capacity to do publishable research, and a high level of teaching competence in M.B.A. and Ph.D. classes. Candidates are expected to hold a doctorate degree or be near completion of the degree. Rank and salary depend on qualifications. Send resume and a list of references to Professor Katherine Schipper, Fuqua School of Business, Duke University, Durham, North Carolina 27708. Duke University is an Affirmative Action/Equal Opportunity Employer.

208 VISITING POSITION WANTED: Ph.D., CPA, CMA (Accounting major, Statistics minor); Associate Professor, areas: Financial Accounting, Theory, Research Methodology at graduate and undergraduate levels; 18 years of experience including professional counseling and teaching assignment in Southeast Asia; 20 published articles, one textbook, and ten communications; *curriculum vitae* and recommendations available upon request; Email: chedli,baccouche@iscae.rnu.tn.

209 SUNY COLLEGE at Brockport, Business Administration: Associate/Assistant Professor, graduate/undergraduate Accounting. Required: Ph.D. or DBA in Accounting from AACSB-accredited school, teaching experience, and effectiveness. Student-focused. Accounting publications (Associate) or scholarly potential and research plan (Assistant), teach in a multicultural environment, team-oriented, strong work ethic, commitment to continuous improvement. Experience/willingness to teach Accounting Information Systems. ABD, completed in one year, considered for nontenure-track position if other qualifications met. Preferred: Doctorate in hand, recent publications, CPA, work experience, experience teaching AIS, International, and/or Managerial Accounting. Begin August 15, 2000. Letter of application must address all qualifications listed above and include a candid discussion of interest in SUNY Brockport. Full vacancy announcement at http://www.brockport.edu/hr/VACANTS.HTM. Letter of application, resume, teaching evaluations, transcripts, and three references to Richard Meade, Faculty-Staff Recruitment, SUNY Brockport, 350 New Campus Drive, Brockport, New York, 14420-2929. Review begins Nov 20, 1999; applications accepted until filled. AA/EOE.

210 MICHIGAN TECHNOLOGICAL UNIVERSITY, School of Business and Economics, invites applications for an anticipated tenure-track position in Taxation and/or Accounting Information Systems beginning Fall 2000. A Ph.D. in Accounting required, professional certification and relevant work experience a plus. Responsibilities will include teaching in Taxation and/or Systems, and Principles; conducting scholarly research; publishing in refereed journals; and service. Rank and salary dependent on qualifications. Please forward a letter of application and a current *curriculum vitae* to R. Eugene Klippel, Dean, School of Business and Economics, Michigan Technological University, 1400 Townsend Drive, Houghton, MI 49931. Michigan Technological University is an Equal Opportunity/Affirmative Action Employer. Applications from women and minorities are especially encouraged.

211 SOUTHEAST MISSOURI STATE UNIVERSITY invites applications for a tenure-track position as Assistant/Associate Professor in Accounting. Responsibilities will include teaching undergraduate/graduate courses in Accounting; demonstrating an active scholarly agenda and a commitment to professional service consistent with the teacher-scholar model and AACSB accreditation standards; advising students and participating in committee work, public service, and professional organizations. Qualifications: Ph.D. or DBA with strong emphasis in Accounting. Professional certification and practical business/accounting experiences are desirable. University teaching and recent scholarly accomplishments preferred. Strong communication and interpersonal skills are expected, as well as demonstrable commitment to the teacher/scholar model, public and university service, and a culturally diverse learning environment. Send resume, brief statement of teaching philosophy, available documentation of teaching effectiveness; example(s) of scholarly work; names, addresses, telephone numbers of three references; and all transcripts. Review will begin after March 1 and continue until position is filled. Contact Dr. Debbie Beard, Chairperson, Southeast Missouri State University, One University Plaza, Cape Girardeau, MO 63701; Phone: (573) 651-2118. Southeast Missouri State University is an Equal Opportunity/M/F/Affirmative Action Employer. Women and minorities are encouraged to apply.

212 SOUTHWEST TEXAS STATE UNIVERSITY invites applications for Chair in the Department of Accounting for Fall 2000. Southwest Texas State University, with over 22,000 students, is located in the Texas Hill Country on the I35 corridor between Austin and San Antonio. The College of Business (offering day and night classes on two campuses) is AACSB-accredited and confers B.B.A., M.B.A., and Master of Accountancy degrees. The Department, with 15 full-time faculty, will expand the B.B.A. and Master of Accountancy degrees by offering an integrated five-year program beginning Fall 2000. Application review for Chair in the Department of Accounting begins March 1. Requirements for the position include: earned doctorate in Accounting from an AACSB-accredited program; experience in teaching and research commensurate with a senior-level appointment at the professor level; dynamic leadership and interpersonal skills; and a demonstrated commitment to enhancing diversity of faculty, students, and staff. Applicants should submit a letter of intent articulating their leadership/management style and their vision for accounting education, *curriculum vitae*, and a list of three references to Wayne B. Sorensen, Ph.D., FACHE, Accounting Search Committee Chair, Chair, Department of Health Administration, SWTSU, San Marcos, TX 78666; Email: ws06@swt.edu.

213 CLARKSON UNIVERSITY, Potsdam, NY, School of Business, invites applicants for a tenure-track position teaching Financial Accounting and/or Taxation beginning Fall 2000. All levels will be considered. Appropriate doctoral degree required (ABD considered). Quality teaching and research productivity are expected of all Clarkson University faculty. Courses to be taught include a broad range of undergraduate, M.S., and M.B.A. classes. Clarkson is a well-endowed private university located in New York State within the Toronto, Montreal, Ottawa, New York City triangle. The School of Business has about 300 undergraduate and 70 graduate majors and is AACSB-accredited. Screening for this position will begin immediately and continue until the position is filled. Submit a letter of application, *curriculum vitae*, and three letters of recommendation to Dr. Fredric C. Menz, Interim Dean, School of Business, Clarkson University, Potsdam, NY 13699-5765; Email: menzf@clarkson.edu. Clarkson University is an AA/EOE Employer. POS #60-99.

214 CLARKSON UNIVERSITY, Potsdam, NY, School of Business, invites effective teachers and researchers to apply for a visiting position, teaching Financial and/or Managerial Accounting during the 2000–2001 academic year. Applicants with an international dimension will be given a preference. Appropriate doctoral degree required. Teaching could be at the undergraduate, M.S., and M.B.A. levels. Clarkson is a well-endowed private university located in New York State within the Toronto, Montreal, Ottawa, New York City triangle. The School of Business has about 300 undergraduate and 70 graduate majors and is AACSB-accredited. Submit a letter of application, *curriculum vitae*, and three letters of recommendation to Dr. Fredric C. Menz, Interim Dean, School of Business, Clarkson University, Potsdam, NY 13699-5765; Email: menzf@clarkson.edu. Clarkson University is an AA/EOE Employer. POS #60-99.

215 UNIVERSITY OF TEXAS AT EL PASO, Department of Accounting, College of Business Administration, invites applications for the position of Assistant/Associate Professor of Accounting, with emphasis in one of three areas: Financial Accounting, Auditing, or Accounting Information Systems. Candidates must have a Ph.D. or D.B.A. with a major in Accounting prior to appointment; professional certification is desirable. The successful applicant will teach graduate and undergraduate Accounting courses, perform research and publication, and perform academic and professional service. AACSB-accredited, the UTEP Department of Accounting has a full-time faculty of 13. The department conducts B.B.A. in Accounting and Master of Accountancy programs, as well as a separate 150-hour Accounting track that results in the award of both the B.B.A. and Master of Accountancy degrees. Application deadline is March 31, 2000, or until position is filled. Send letter of application, *curriculum vitae*, and names of three references to Dr. Gary J. Mann, Chair, UTEP, Department of Accounting, El Paso, Texas 79968-0542. The University of Texas at El Paso does not discriminate on the basis of race, color, national origin, sex, religion, age, disability, or sexual orientation in employment or the provision of services.

216 EMORY UNIVERSITY, Roberto C. Goizueta Business School, seeks applicants for faculty positions in Accounting at all ranks. Salaries and research support are competitive. Senior candidates must possess a national reputation for scholarship and service, success in teaching in business school programs (undergraduate, M.B.A., Ph.D., and Executive Education), and a commitment to institution building. Qualified applicants for junior positions must possess good research skills, a doctoral degree (completed or close to completion), and evidence of a strong commitment to teaching and research. The deadline for application packets containing a *curriculum vitae*, two letters of recommendation, and a working paper to be presented in a workshop during a campus visit, is February 15, 2000. Applications should be sent to Professor Consuelo L. Kertz, Goizueta Business School, Emory University, 1300 Clifton Road, Atlanta, GA 30322. Emory University is an Equal Opportunity / Affirmative Action Employer. Applications from qualified minority and female candidates are strongly encouraged.

217 EAST CAROLINA UNIVERSITY, Department of Accounting, invites applications for three Assistant/Associate Professor positions in Accounting effective August 15, 2000. Applicants should have or expect to have a Ph.D. in Accounting by December 2000. Our current needs include Cost, Audit, Business Law, and AIS. The positions are currently funded. ECU is a comprehensive university (18,000 students) with AACSB accreditation (School level). We offer an undergraduate degree and a M.S.A. (concentrations in Taxation and MIS). We are seeking candidates with excellent teaching skills. We have reasonable research expectations and require participation in service to the school and the profession. Send credentials to Dr. Edwin Doty, Chairperson, Accounting Department, School of Business, 3208-A G.C.B., ECU, Greenville, NC 27858-4353. Official transcripts are required upon employment. Applicants must comply with the Immigration Reform and Control Act. ECU is an Equal Opportunity/Affirmative Action University and accommodates individuals with disabilities.

218 MANCHESTER COLLEGE, Department of Accounting and Business, invites applications for a tenure-track position at the Assistant/Associate Professor rank beginning fall 2000. Master's degree and professional certification (CPA, CMA, etc.) or Ph.D. required. Candidates with experience in Public or Industry Accounting and college-level teaching preferred. The successful candidate will teach 24 semester hours per year in Financial Accounting, Managerial/Cost Accounting, and/or Accounting Information Systems. Review of applications will begin January 31, 2000 and continue until position is filled. Send letter of application, *curriculum vitae*, three letters of recommendation, evidence of teaching effectiveness, and transcripts to Jan Fahs, Chair, Department of Accounting and Business, Manchester College Box 138, North Manchester, IN 46962-1276. AA/EOE.

219 METROPOLITAN STATE UNIVERSITY invites applications and nominations for a full-time, tenure-track faculty position in the Accounting/Finance Department with a specialization in Management Accounting. Required qualifications include at minimum an ABD in Accounting with completion of doctorate at the time of appointment (Fall 2000). Ph.D. or D.B.A. in Accounting preferred, CMA, a minimum of two years of full-time equivalent teaching experience in Accounting at the university level, and a demonstrated understanding of and commitment to cultural diversity. Open until filled. Appointment begins August 2000. Salary is commensurate with education and experience. For additional information, email Tim.Dokken@metrostate.edu or call (612) 341-7460 or TTY users, (651) 772-7687. Submit a letter of application explicitly addressing the qualifications, a resume, and at least three letters of reference to Dennis C. Daly, Chairperson, Accounting Faculty Search, Metropolitan State University, 730 Hennepin Avenue, Minneapolis, MN 55403-1897. AA/EEO.

220 NORTH CAROLINA A&T STATE UNIVERSITY invites applications for a tenure-track Assistant Professor position in Taxation for August 2000. Applicants should have a Ph.D. in Accounting. ABDs nearing completion will be considered. Professional certifications are highly desirable. Applicants should have a strong commitment to teaching and research. Salary and benefits are competitive. The School of Business and Economics is AACSB-accredited in Business and Accounting, and has 65 faculty members including 12 in Accounting. The Accounting program is a national target school for major professional service firms and corporations. The university is in a dynamic metropolitan area of 1 million. Information regarding NC A&T and beautiful Greensboro is available at www.ncat.edu. The position will remain open until filled. Please submit *curriculum vitae* and three letters of reference to Mark Kiel, Department of Accounting, School of Business and Economics, North Carolina A&T State University, Greensboro, NC 27411. North Carolina A&T is an EEO/AA employer.

221 UNIVERSITY OF TENNESSEE AT MARTIN invites applications for Assistant, Associate, or Professor of Accounting to fill two tenure-track positions. Earned doctorate from an accredited institution is preferred. Responsibilities include teaching undergraduate and graduate classes, research, and outreach activities. Interest in technology-based course delivery is required. Research efforts should result in publications that advance knowledge and/or improve accounting practices; publications in scholarly journals are required for tenure consideration. Send resume to Chair, Accounting Search Committee, Department of Accounting, Management & Information Systems, 115 Business Administration Building, University of Tennessee at Martin, Martin, TN 38238. Search will remain open until positions are filled. UT Martin enrollment is 5,700; the School of Business Administration enrollment is approximately 1,100 students in five different undergraduate majors and two graduate programs: M.B.A. and Master of Accountancy. The campus emphasis is solidly on excellence in instruction; we seek candidates who demonstrate a similar commitment. UTM is an EEO/AA/Title IX/Title VI Section 504 ADA/ADEA employer. All qualified persons (regardless of race, color, national origin, religion, sex, age, disability, or veteran status) are strongly encouraged to apply.

222 LOUISIANA STATE UNIVERSITY IN SHREVEPORT invites applications for a tenure-track position at the Assistant, Associate, or Full Professor level, with possible consideration as Chair of the Accounting Department. A doctoral degree and a strong commitment to both research and teaching are required. Professional certification is highly desirable. All areas are invited to apply, but the strongest need is in Auditing. Candidates should be active in professional organizations and have the ability and willingness to interact with the business community. LSUS is an AACSB-accredited school located in a growing metropolitan area and offers a competitive salary. Review of candidates will begin immediately and continue until the position is filled, with a tentative beginning date of August 2000. Please submit a resume including three references to Douglas S. Bible, Chair, Department of Economics and Finance, LSUS, Shreveport, LA 71115, dbible@pilot.lsus.edu. LSUS is an Equal Opportunity/ Affirmative Action Employer.

223 ROCHESTER INSTITUTE OF TECHNOLOGY invites applications for a tenure-track Accounting faculty member at the Assistant or Associate/Full rank. Candidates at the Associate/Full rank must have a well-established publication record as well as evidence of solid teaching. All areas of professional interest are welcome. RIT is a private university with 14,000 students. The College of Business is AACSB-accredited with 800 undergraduates and 500 graduate students. Applications will be accepted until the position is filled. Address applications and inquiries to Faculty Searches, Office of the Dean, College of Business, RIT, Rochester, NY 14623-5608. RIT is an EEO employer and encourages applications from minorities and women.

224 HOPE COLLEGE invites applications for a one-year, nontenure-track position beginning August 2000. Teaching responsibilities include introductory Financial Accounting and Intermediate Accounting during the fall semester and introductory Managerial Accounting and Auditing during the spring semester. An M.B.A. and/or CPA and professional experience in Accounting is preferred. Hope College is a Christian co-educational, residential, liberal arts undergraduate college affiliated with the Reformed Church in America, has over 2,900 students and 219 FTE faculty, in a rapidly growing urban area of 100,000, near Lake Michigan. Additional information about Hope College can be found on the web at http://www.hope.edu. A letter of application and *curriculum vitae* should be sent to Dr. James B. Heisler, Chairperson, Department of Economics and Business Administration, Hope College, PO Box 9000, Holland, MI 49422-9000.

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AMERICAN ACCOUNTING ASSOCIATION

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Purchase, Pooling, and Equity Analysts' Valuation Judgments

Patrick E. Hopkins
Indiana University
Richard W. Houston
University of Alabama
Michael F. Peters
University of Maryland

ABSTRACT: We provide evidence that analysts' stock-price judgments depend on (1) the method of accounting for a business combination and (2) the number of years that have elapsed since the business combination. Consistent with business-press reports of managers' concerns, analysts' stock-price judgments are lowest when a company applies the purchase method of accounting and ratably amortizes the acquisition premium. The number of years since the business combination affects analysts' price estimates only when the company applies the purchase method and ratably amortizes goodwill—analysts' price estimates are lower when the business-combination transaction is further in the past. However, this joint effect of accounting method and timing is mitigated by the Financial Accounting Standards Board's proposed income-statement format requiring companies to report separate line items for after-tax income before goodwill charges and net-of-tax goodwill charges. When a company uses the purchase method of accounting and writes off the acquisition premium as in-process research and development, analysts' stock-price judgments are not statistically different from their judgments when a company applies pooling-of-interest accounting.

We offer our sincerest thanks to the financial analysts and portfolio managers who unselfishly gave their time and efforts to this project and to Keith Brown, former director of the Research Foundation of the Institute of Chartered Financial Analysts, for his continued support of analyst-related research. We also thank Steve Baginski, Michael Bamber, Walt Blacconiere, Dick Dietrich, Frank Hodge, Ivo Jansen, Todd Johnson, Michael Kimbrough, Craig Lefanowicz, Laureen Maines, Roger Martin, Mark Peecher, Fred Phillips, Jamie Pratt, Jerry Salamon, Geoff Sprinkle, Nathan Stuart, Jim Wahlen, an anonymous reviewer, and the workshop participants at the University of Alabama, the University of Illinois, Indiana University, the University of Maryland, Michigan State University, and the University of Saskatchewan for their helpful comments. This paper also has benefited from presentations at the Business Measurement and Assurance Services Conference and the 10th Annual Financial Economics and Accounting Conference. Finally, we gratefully acknowledge financial support from the Kelley School of Business at Indiana University, the Culverhouse College of Commerce and Business Administration, and Culverhouse School of Accountancy at the University of Alabama.

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Data Availability: *Contact the authors.*

I. INTRODUCTION

In this study, we investigate whether analysts' stock-price judgments depend on (1) the method of accounting for a business combination and (2) the number of years that have elapsed since the business combination. The decades-old controversy over purchase vs. pooling-of-interests ("pooling") methods of accounting for business combinations motivated this investigation. Under purchase-accounting rules, the acquiring firm ("acquirer") recognizes—and usually eventually expenses—the difference between the fair value paid for the acquired firm ("target") and the book value of the target's net assets. This difference, hereafter called the accounting acquisition premium ("AAP"), often represents a substantial proportion of the amount paid for a target.[1] Ratably amortizing the AAP can significantly reduce the combined entity's net income for many years after the business combination.

By contrast, pooling accounting requires the acquirer to record the target's net assets at book value (i.e., the AAP is not recorded). Therefore, if all else is equal, future reported net income after applying pooling accounting is typically higher than net income reported after applying purchase accounting.[2] Prior research suggests that companies go to great lengths to avoid AAP amortization, either by structuring acquisitions to qualify for pooling treatment (e.g., Lys and Vincent 1995) or by allocating large portions of the AAP to in-process research and development and then immediately expensing it (Deng and Lev 1998). The Financial Accounting Standards Board (FASB) has proposed eliminating pooling of interests accounting (FASB 1999b), and has considered restricting firms' ability to immediately expense in-process research and development (FASB 1999a).[3] The Board also proposed that companies be required to report, on the face of the income statement, a subtotal for after-tax income before goodwill charges and a line-item for net-of-tax goodwill charges (FASB 1999b, para. 52).

Public opinion regarding the elimination of pooling is mixed. Because the FASB's proposal will require all companies to record the AAP, many company executives and underwriters fear that the new rules will depress share prices because investors (1) will insufficiently adjust reported income for AAP amortization, and (2) are even less likely to adjust for AAP amortization in years after the business combination (e.g., Palepu 1987; Lys and Vincent 1995; McGoldrick 1997). However, others argue that purchase-vs.-pooling differences are not value relevant because the two methods result in identical cash flows (e.g., Jenkins 1999).

Prior research has not provided consistent evidence on the effect of pooling-vs.-purchase accounting on the share prices of post-combination entities. One explanation for the inconsistent research results is that prior studies are largely archival and could not completely control for potential correlated-omitted factors that accompany complex events like business combinations. This paper complements existing research by reporting the results of a between-subjects experiment designed to control for many of the factors potentially omitted from prior research designs.

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[1] The total AAP can include two components: (1) the step-up of previously recognized net assets to fair value and (2) the remaining unallocated excess of the purchase price over the fair value of net assets (i.e., goodwill). Because this paper focuses on the latter component, we refer to the AAP and goodwill interchangeably.

[2] Our discussion of purchase-vs.-pooling differences strictly refers to financial reporting differences and assumes that the two methods have identical tax and cash flow characteristics. Hereafter, all comparisons between purchase and pooling assume the combination of companies involved a tax-free exchange of common shares.

[3] In July 1999, the FASB postponed consideration of purchased in-process research and development because Board members believed they could not address this issue separately from all other research and development costs (FASB 1999a).

In our experiment, 113 buy-side equity analysts estimated the price of a company's publicly traded common stock. The first factor we manipulated was the *accounting method* the acquirer used to record a previous stock-for-stock business combination. The combined company took one of three approaches: (1) it recorded (and amortized) the AAP under the purchase method, (2) it immediately expensed the entire AAP in the year of acquisition under the purchase method, or (3) it did not record the AAP because it applied the pooling-of-interests method. The second factor we manipulated was the *number of years* since the business combination: the combination occurred either one year ago or three years ago. We also developed an additional set of materials that conformed to the FASB's proposed pre-goodwill-amortization income format.

This design allowed us to directly test hypotheses related to the business-combinations-accounting debate. Based on research in judgment and decision making, we predicted that capitalizing and amortizing the AAP would result in lower stock prices than applying the pooling method or allocating the AAP to in-process research and development. In addition, because AAP amortization is less salient in later years, we expected the passage of time to exacerbate the negative effect of AAP amortization on analysts' stock-price estimates. Finally, because the FASB's proposed changes to the format of the income statement will increase the salience of pre-goodwill-amortization income, we expected the FASB's proposal to mitigate the negative effects of AAP amortization on stock-price judgments in later years.

The results supported all of these predictions. When analysts received the traditional income statement format, their stock-price judgments were lowest when the company applied purchase accounting and ratably amortized the AAP. In addition, when the company applied purchase accounting and ratably amortized the AAP, analysts' stock-price judgments were comparatively lower if the business combination occurred three years ago rather than one year ago. However, when the business combination occurred three years ago, analysts using financial statements in the FASB's proposed format provided significantly higher stock prices than analysts receiving financial statements in the traditional format. In fact, the FASB's proposed income statement format yielded price judgments that were not significantly different from the prices provided by analysts when the company applied pooling accounting or when the company applied purchase accounting and wrote off the AAP as in-process research and development.

To investigate *why* analysts' price judgments differed, we asked participants to estimate a proxy for the company's value-relevant net income. Analysts' net income judgments were not significantly different from the company's pre-AAP-expense net income *unless* the business combination occurred three years ago *and* the company ratably amortized the AAP under the purchase method. In this case, analysts' estimates of the company's economic income were lower than in all of the other conditions. Analysts could accurately recall the total amount of the acquisition-date AAP *and* the amount of AAP amortized in the most recent income statement, so this failure to adjust was *not* because investors could not find information about the AAP or goodwill amortization in later years (Palepu 1987, 88; Lys and Vincent 1995, 374). Instead, our results suggest that the salience of income statement information (1) is jointly influenced by business-combination timing and accounting methods, and (2) affects the amount of AAP expense included in analysts' estimates of value-relevant income.[4]

This study provides descriptive evidence as the FASB enters the public comment and re-deliberation phase of the Business Combinations project. Our results are consistent with the popular contention that differences in business-combination accounting affect investors' judgments and decisions, perhaps by impairing comparability across companies. We also provide *ex ante* evidence concerning the FASB's proposed pre-goodwill-amortization earnings-per-share format. By highlighting pre-goodwill-amortization income, the proposed standard increases the likelihood that analysts will use pre-amortization earnings in their valuation judgments—most likely because this figure is more salient under the FASB's proposal. These results help explain why many companies voluntarily report pre-amortization income in quarterly earnings releases.[5]

The next section describes the major issues related to business combination accounting and develops the hypotheses. The third section describes our experiment; the fourth presents our results. The final section discusses the results and conclusions.

II. BACKGROUND AND HYPOTHESES

Accounting for Business Combinations

Purchase vs. Pooling

The controversy over accounting for business combinations has dogged regulators and standard setters for more than half a century. The heart of the controversy centers on the noncomparable financial statements that result from the two generally accepted methods of accounting for business combinations: purchase and pooling of interests.

The purchase method is consistent with the accounting rules typically applied to assets purchased in the ordinary course of business. The target's net assets are reported in the consolidated balance sheet at the fair value of the consideration (usually cash or stock) exchanged for the target's common shares. The difference between the fair value paid for the target and the book value of the target's net assets is called the accounting acquisition premium ("AAP"). The AAP is first allocated to the fair values of the target's identifiable net assets. Any remaining (unallocated) AAP is classified as goodwill and amortized over a period not to exceed 40 years.[6]

In contrast, pooling requires the acquirer to record the historical book values of the target's net assets. The AAP is not recorded in combinations that qualify for pooling treatment; therefore, they generally report higher net income relative to otherwise identical combinations that apply the purchase method. In addition, pooling requires the acquirer to recognize the target's net income for the entire year in which the business combination occurred, regardless of the actual transaction date. Under pooling, prior years' financial statements are restated to combine the financial statements of the two companies as if they have always been a single economic unit. This unusual mixture of book-value recognition and prior-period restatement originated almost a century ago "for combinations in which a strong degree of affiliation existed between the combining entities prior to the combination" (FASB 1998, Appendix p. 3). Since that time, this treatment has been extended to combinations of entities without prior affiliation.

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[4] Although our study provides evidence that analysts do not uniformly adjust net income for AAP-related charges, we do not take a position on whether analysts *should* adjust for those charges. Some financial-statement analysis and valuation textbooks (e.g., White et al. 1997, 780) advocate removing the effects of AAP-related charges from net income under the purchase method. In contrast, others suggest that ignoring the AAP (via pooling) may partially overlook the full fair-value-based cost of stock-for-stock business combinations (Palepu et al. 2000, 8–5).

[5] In addition to a number of companies commonly reporting pre-amortization EPS, First Call Corporation announced in April 1999 that it would begin publishing "cash flow EPS" estimates for a subset of the companies that it follows (MacDonald 1999b). First Call defines this measure as a company's earnings before goodwill charges. Despite its label, cash flow EPS is not a reliable proxy for cash flows, *per se*, but it does parallel the FASB's proposed pre-goodwill-amortization earnings.

[6] The Business Combinations Exposure Draft requires amortizing purchased goodwill over a period not to exceed 20 years (FASB 1999b, para. 37).

Acquired In-Process Research and Development

If a company must apply the purchase method and management believes that investors penalize firms that amortize the AAP, then management has an incentive to immediately expense the AAP. During the 1990s, companies increasingly applied FASB (1975), Interpretation No. 4 "FIN 4," to write off, on the acquisition date, significant portions of the AAP (Deng and Lev 1998). Writing off the fair value of acquired in-process research and development ("IPR&D") is consistent with the requirement to expense, when incurred, all research and development costs (FASB 1974). However, unlike traditional research and development costs, the IPR&D write-off depends on the *fair value* of a research project (i.e., it is a function of projected prices and demand for the potential product), and is not determined by the amount actually spent on the research and development activity.

Companies that write off large proportions of the AAP as IPR&D improve their accounting-based performance measures in later years.[7] For example, in later years, these write-offs increase the numerators and decrease the denominators of return on equity (ROE) because the AAP is not capitalized and amortized. Based on a sample of firms that wrote off significant portions of the AAP as IPR&D, Deng and Lev (1998) suggest that, in the year after the write-off, these firms' ROE was about 37 percent higher than if they had capitalized and amortized the AAP.

Prior Research

Costs and Benefits of Obtaining Pooling Treatment

Although the use of purchase or pooling accounting is not a choice, *per se*, companies that otherwise would be required to use purchase accounting appear to be willing to incur significant direct and indirect costs to qualify for pooling treatment.[8] Empirical and anecdotal evidence suggests that companies incur significant costs to meet APB No. 16's pooling criteria. For example, while Nathan (1988) did not find higher acquisition premia for firms applying the pooling method, Robinson and Shane (1990), Davis (1990), Vincent (1997), and Ayers et al. (2000a) suggest that poolings result in higher acquisition premia than purchases. Ayers et al. (2000a) estimate that 15 percent of the acquisition premium in poolings is attributable to the cost of obtaining pooling treatment. Similarly, Lys and Vincent (1995) suggest that AT&T, in its acquisition of NCR, incurred approximately $50 million of incremental costs to qualify for pooling treatment.

These higher premia suggest that either fundamental differences exist between the companies that qualify for pooling vs. purchase accounting, or acquirers are willing to pay an additional amount for the future accounting benefits afforded by pooling. Based on a sample of firms using the pooling method, Ayers et al. (2000b) estimated that EPS would have been 18.5 percent lower, and median ROE and market-to-book ratios 22 percent lower, had these firms used the purchase method. Consequently, if investors do not adjust for the post-acquisition accounting differences between purchase and pooling, then structuring business combinations to qualify for pooling-of-interest treatment (and avoiding the AAP's drag on reported income) may benefit combining companies. However, if a business combination is structured as a tax-free reorganization, then application of the two methods results in identical past, present, and future direct cash flows. Therefore, *for otherwise identical companies*, an efficient-markets perspective suggests that applying different business-combination accounting methods should not affect stock prices.

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[7] The SEC is concerned that companies make excessive allocations to IPR&D to reduce the amount of the AAP that is capitalized as goodwill and subsequently subtracted from income as goodwill amortization (MacDonald 1999a). To date, the SEC has required a number of companies to restate earnings and reduce the amount of AAP classified as IPR&D after examining the assumptions used to appraise its value (Schroeder 1999). Before the SEC began cracking down on perceived abuses of the FIN 4 allocation, the amount of AAP classified as IPR&D commonly exceeded 70 percent of the acquisition price, causing more than 75 percent of the companies taking the IPR&D charge to post losses in the quarter in which the charge was taken (Deng and Lev 1998).

[8] Accounting Principles Board (APB 1970) Opinion No. 16 lists 12 criteria—all of which must be satisfied—for a business combination to qualify for pooling-of-interest accounting. Because these criteria specify attributes of the combining companies and the terms of the business-combination transaction, purchase-vs.-pooling accounting technically is not a choice.

Managers' Beliefs about the Effect of Purchase Accounting on Stock Price

Managers' efforts to obtain pooling treatment suggest they believe that purchase accounting is costly relative to pooling accounting. Survey evidence suggests that senior managers of U.K.-listed companies believe investors downgrade investment ratings when companies amortize goodwill (Gore et al. 2000). These managers also reported that allowing the immediate write-off of goodwill would provide an advantage for U.K. companies over foreign competitors that must capitalize and amortize goodwill. This evidence is consistent with the reported reasons why some U.S. firms expense most of the AAP as IPR&D (Deng and Lev 1998, as discussed in MacDonald 1997).

The Effect of Business Combination Accounting on Stock Price

Academic research has not yet documented direct benefits for firms applying pooling instead of purchase accounting. Indeed, to the contrary, evidence suggests positive abnormal returns for the purchase method, but not the pooling method, during the period surrounding the merger announcement (Hong et al. 1978; Davis 1990). To date, research has not isolated the economic- or accounting-based factors that explain this result.

In addition to these "event study" research designs, others have examined the value relevance of the financial-statement information that results from applying purchase and pooling accounting. Jennings et al. (1996) provide evidence that contradicts the claim that purchase-accounting hurts share prices because of future years' goodwill amortization. Their results suggest that reported goodwill assets are associated with higher share prices, and that periodic goodwill amortization is not value-relevant. In a related study, Vincent (1997) suggests that, for the first three years after an acquisition, the imputed AAP is not valued as an asset for poolings, whereas the recognized AAP is undervalued for firms applying the purchase method. In contrast to Jennings et al. (1996), she finds that purchase-method AAP amortization is associated with lower share prices, suggesting that market participants view goodwill amortization as an expense.[9] Finally, Deng and Lev (1998) suggest that stock is valued as if investors add back IPR&D write-offs to reported income.

The fact that no clear pattern has emerged from prior research on the relation between business-combination accounting and stock prices suggests that the largely archival research designs may not have sufficiently controlled for factors that simultaneously determine accounting choice and stock returns (i.e., correlated-omitted variables). Consequently, research has not answered the most basic questions about whether application of purchase vs. pooling accounting *causes* systematic variation in individual investors' fundamental analysis and valuation judgments. That is, if all else is equal, does different accounting treatment of the AAP alter investors' evaluation of the company? We address this question by conducting an experiment that is designed to control for all differences between firms except for the financial statement differences caused by the accounting treatment of the AAP.

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[9] Duvall et al. (1992) suggest that many companies do not disclose enough information to allow analysts to convert financial statements from purchase to pooling, or vice versa. For example, 76 percent of their sample did not disclose goodwill amortization; about one-third did not disclose periods over which goodwill is amortized; and 58 percent did not disclose net goodwill or accumulated goodwill amortization.

Hypotheses

The heart of the purchase-pooling debate centers on whether investors and creditors make the necessary adjustments to evaluate, on an equivalent basis, business combinations that are recorded using the purchase vs. pooling methods. Prior research in accounting and other contexts suggests that people use simplifying strategies in complex task environments (see Payne et al. 1993). We draw on this research to develop hypotheses that predict that different methods of accounting for business combinations will lead analysts to make different stock price judgments.[10]

Purchase with Goodwill Amortization vs. Pooling

Prior research has shown that people tend to use data the way they are provided (Slovic 1972), and focus primarily on information considered the most important (Payne et al. 1993). Analogously, financial analysts appear to focus on reported income statement and balance sheet information, even when supplemental information facilitates adjustment (Hopkins 1996; Hirst and Hopkins 1998; Maines et al. 2000). Consequently, based on the results of prior judgment and decision-making research and the views commonly expressed by company managers, we posit that analysts performing a valuation task will not adjust purchase and pooling financial information to a single, consistent basis of accounting, even if supplemental information to reconcile purchase and pooling accounting appears in the financial statements. We propose the following (alternative) hypothesis.

> **H1:** Equity analysts will predict a lower stock price for a company's outstanding common stock when the company applies purchase accounting and amortizes goodwill than when the company applies pooling-of-interests accounting.

Purchase with Goodwill Amortization vs. Purchase with IPR&D

The recent increase in the number of companies writing off significant portions of the AAP as IPR&D is partly attributable to the boom in technology-related business combinations. However, it also parallels a general increase in companies reporting one-time write-offs and restructuring charges. Salience-related psychology research suggests that managers may have incentives to aggregate multi-period expenses and report them as a large, single-period charge. In particular, research has found that people are more likely to attend to salient information (Andreassen 1990) and that information is more salient when it is large, is unusual, and/or conveys negative information (Abelson and Levi 1985; Stephan 1985). Therefore, compared to ratably amortizing the AAP, IPR&D write-offs should be highly salient because they are unusually large and convey negative (expense) information that often results in reported losses (Deng and Lev 1998).

After analysts notice the IPR&D charge, they must decide how it should affect their estimate of the firm's common-stock price. Prior research suggests that more transitory components of income should receive less weight than permanent components in predicting future income and stock returns (see Easton [1998] and Schrand and Walther [2000] for reviews of relevant literature). IPR&D write-offs are likely to be perceived as more salient and transitory components of income than multi-period amortization of purchase-method AAP. Therefore, when estimating a company's stock price, analysts are more likely to remove from their estimate of value-relevant income the effects of AAP charges when these charges are written off as IPR&D. We propose the following (alternative) hypothesis.

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[10] Prior research suggests that equity analysts typically use earnings-based valuation models (e.g., Hirst and Hopkins 1998). Therefore, our hypotheses predict higher (lower) stock prices when we expect analysts to estimate higher (lower) value-relevant income.

> **H2:** Equity analysts will predict a lower stock price for a company's outstanding common stock when the company applies purchase accounting and amortizes the AAP as goodwill than when the company writes off the entire AAP as IPR&D.

The Effect of Passing Time on Purchase Accounting with Goodwill Amortization

Many merger participants believe that investors are unlikely to adjust for the effect of AAP amortization on reported net income in future years, thereby resulting in lower stock prices (Davis 1996; Vincent 1997).[11] For example, Lys and Vincent's (1995) evidence suggests that AT&T structured its acquisition of NCR as a pooling of interests because of management's fear that, in subsequent years, "even financial analysts" would fail to recognize that net income is reduced by goodwill amortization and that this oversight would reduce future years' stock price. One explanation for this belief is that investors may simply "forget" the past accounting choice and fail to adjust for its effect on current earnings (e.g., Dharan and Lev 1993; Schrand and Walther 2000). This argument is quite plausible given the vast amount of information that companies report and the difficulties in tracing the effects of these items through time (Palepu 1987; Schipper 1989). Indeed, Duvall et al. (1992) note that only 20 percent of their sample of purchase-method companies provides detail regarding annual goodwill amortization.

Even if analysts are aware of the existence of goodwill, the salience theory underlying H2 also suggests that individuals are likely to process annual goodwill-amortization charges differently depending on the number of periods of amortization included in the income statement. Information is less salient when it is perceived as immaterial or typical, and people are less likely to attend to information that is less salient (Abelson and Levi 1985; Stephan 1985). Generally, goodwill-amortization charges are comparatively small components of income statements and, as time passes after a business combination, goodwill amortization becomes an increasingly typical expense (i.e., it repeats across time), thereby reducing its salience. Therefore, the diminished salience of goodwill amortization in the income statement in later years should reduce the likelihood that analysts explicitly remove amortization in their estimates of value-relevant income.[12] Therefore, we propose the following (alternative) hypothesis.

> **H3:** Given that a company records and amortizes an AAP in a purchase-method business combination, equity analysts will predict a lower stock price for the company's outstanding common stock when the business combination occurred three years ago than when it occurred one year ago.

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[11] The belief that AAP amortization should be removed from income is consistent with guidance offered in traditional financial-statement-analysis and valuation textbooks. For example, White et al. (1997, 780) state, "For purposes of analysis...the amortization of goodwill should be added back to income." This treatment of goodwill amortization is also consistent with First Call's recent decision to provide pre-goodwill-amortization income for a subset of companies in its database.

[12] In later years, amortization expense will have appeared in several past income statements. If this repetition causes analysts to perceive the amortization as a more permanent component of income, they are less likely to reduce the weight placed on this component; that is, they are less likely to explicitly remove this charge from their estimate of value-relevant income.

The FASB's Proposed Reporting of Goodwill Amortization

In an Exposure Draft issued in September 1999, the FASB proposed that goodwill amortization and impairment charges (collectively referred to as "goodwill charges") be reported, on a net-of-tax basis, as a separate line item after income taxes. The Board also proposed that companies report a separate subtotal after taxes, but before the goodwill charges (FASB 1999b, para. 52). Companies will be permitted (but not required) to report corresponding per-share amounts for goodwill charges and for the subtotal preceding that amount (FASB 1999b, para. 57).

Research in psychology suggests that providing additional information or changing the format of information helps users overcome information-processing deficiencies, perhaps by making key components of the decision environment more salient (Fiske and Taylor 1984). Clearer presentation of information increases the likelihood that the information will be used (Sanbonmatsu et al. 1997) and increases the likelihood that judgments and decisions will be unbiased (Johnson et al. 1988). In a valuation context, Hirst and Hopkins (1998) demonstrate that clear presentation of value-relevant information increases the likelihood that analysts will include the information in their stock-price judgments. In the context of this study, separately reporting pre-goodwill-amortization income increases its salience. Therefore, we predict that income-statement reporting of pre-goodwill-amortization earnings increases the likelihood that analysts will use that figure in their valuation judgments. This leads to the following (alternative) hypothesis.

> **H4:** Given that a company records and amortizes an AAP in a purchase-method business combination that occurred three years ago, equity analysts will predict a lower stock price for the company's outstanding common stock when goodwill amortization is reported in the body of the income statement than when it is reported as a separate line item after income taxes.

III. EXPERIMENT

To investigate the effect of accounting for business combinations on equity analysts' stock-price judgments, we designed and executed a 3 × 2 between-subjects experiment, along with an additional condition that tests the FASB's proposed change to the format of the income statement. Consequently, there are seven versions of the case. Participants were 113 buy-side equity-security analysts and portfolio managers.[13] The participants, 45 percent of whom were CFAs, averaged 8.5 years of experience as financial analysts. They spent 43 percent of their time on equity-securities analysis and another 40 percent on portfolio management. The average portfolio under management was $852 million (median $110 million) and included 64 companies (median 45). In addition, their employers managed an average of $21.9 billion (median $3.5 billion) of assets.

The design of the experiment held constant all information, except the information directly related to the two independent variables. The first independent variable was the method of accounting for the business combination. We manipulated this variable between subjects at three levels: (1) pooling of interests ("POOL"), (2) purchase with the AAP expensed as in-process research and development ("PURCH-RD"), or (3) purchase with the AAP capitalized as goodwill and amortized over six years ("PURCH-GW"). Because intangible assets similar to IPR&D have a relatively short useful life (e.g., Deng and Lev 1998, 22), we amortized goodwill over six years so that the economics of the PURCH-GW condition paralleled the PURCH-RD condition. Across the accounting methods, direct cash flows were identical because the merger involved a tax-free exchange of common shares.

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[13] We recruited all participants from *Nelson's Directory of Investment Managers* (Nelson Publications 1998) and the Association for Investment Management and Research *1998 Membership Directory* (AIMR 1997) based on their self-reported job descriptions. After securing their agreement to participate, we distributed the materials via overnight mail to 219 analysts, yielding a 52 percent response rate. No early/late respondent differences were noted. To preclude collaboration, both the initial contact with participants and the written instructions for the case asked participants not to discuss this project with colleagues. Collaboration is unlikely, as our sample included analysts from 82 different companies in 20 different states.

The business combination described in the POOL-treatment materials satisfied APB Opinion No. 16's (APB 1970) 12 criteria for pooling-of-interests accounting. In contrast, the business combination described in the purchase materials (PURCH-RD and PURCH-GW) satisfied all of the conditions except the requirement that the business-combination take less than a year to complete. (We told pooling-method participants that the transaction "took slightly less than a year to consummate" and we told the purchase-method participants that the transaction "took slightly longer than a year to consummate.") We chose to violate the transaction-time requirement for pooling because it was the least likely of the 12 criteria to be economically meaningful.

The second independent variable was the year the business combination was consummated. The business combination occurred either at the beginning of the most recent fiscal year (i.e., in fiscal 1999, "RECENT") or at the beginning of the three-years-prior fiscal year (i.e., in fiscal 1997, "PAST"). We designed the materials so that the business combination occurred at the beginning of the fiscal year because of the pooling-method requirement that the combined company recognize the acquirer's and target's income for the entire year in which a business combination occurs, regardless of the date of combination. In contrast, the purchase-method only allows the combined entity to recognize the target's income after the acquisition date. Therefore, for the purchase-method income statement to include the target's income for the same period as the pooling-method income statement, the business combination *had to occur* at the beginning of the fiscal year.

To provide *ex ante* evidence about whether the FASB's proposed change to goodwill amortization reporting on the income statement mitigates the predicted negative effect of goodwill amortization on price judgments, we designed and tested an additional version of the experimental materials. To conform with the rules proposed in the exposure draft, this version of the case (PAST/FASB-GW) was identical to the PAST/PURCH-GW version, with two important exceptions. First, we moved goodwill amortization in the income statement from a component of "total costs and expenses" to immediately after "income from continuing operations." Second, we provided per share amounts for after-tax "income from continuing operations" and "net income"—that is, the income totals immediately preceding and succeeding "goodwill amortization."

The case materials consisted of two parts, a stock-price-valuation task followed by post-experiment questions. The case described Bransford, a hypothetical company that designs, manufactures, and distributes highly engineered components made from specially formulated high performance polymer materials (SIC 3069). Bransford acquired Wareham, a company that engages in the research, development, and distribution of state-of-the-art medical products and systems (SIC 3841). The case was based on an actual business combination for which the merged entity is currently listed on the New York Stock Exchange.

We selected the industries and companies by analyzing recent business combinations listed in the periodical, *Mergers and Acquisitions*. We searched for a business combination of two companies in similar industries for which it was conceivable that the AAP could be classified as either in-process R&D or goodwill. To minimize the likelihood that our analysts recognized the combination used in the case, we intentionally avoided combinations in the *Mergers and Acquisitions* "Top 100 of 1997" list. We also avoided combinations in high technology and Internet industries because the financial press has recently scrutinized these industries' IPR&D accounting. We obtained the appropriate financial statements via *Compact Disclosure* and modified them to incorporate this study's independent variables.

Participants received background information about the combined entity, its industry, industry average price-earnings ratios and ranges, and summary historical financial information. This information was followed by a stylized press release (as disseminated by Bloomberg Financial Services) announcing the company's annual earnings. The press release also included the current year's financial statements (i.e., comparative income statements, balance sheets, and statements of cash flows) and a summary of significant accounting policies. (The income statement information appears in the Appendix.) An important feature of our design is that the summary of significant accounting policies included, across all purchase and pooling conditions, three years of *identical* pro forma revenues and net income for each of the two companies in the business combination.[14] Therefore, all participants had enough information to construct the financial statements in any of the other conditions.

After reviewing the industry and company background information and the company's financial statements as included in the press release, participants estimated the price of the company's common stock. We also asked a series of questions about the company, its performance, and its financial statements. The participants calculated Bransford's return on assets (ROA) in a manner consistent with "how [they] would compute ROA to evaluate Bransford's current performance and its future prospects." In asking analysts to estimate Bransford's ROA, we were careful to indicate that we were interested in differences in the items that different analysts include in the ratio. Consequently, we asked analysts to specify their "supporting adjustments and computations" for the numerator and denominator of the ROA ratio. This procedure allowed us to examine whether participants adjusted reported income for goodwill amortization (ROA numerator is denoted as "INCOME") and whether they adjusted reported assets for the asset goodwill (ROA denominator is denoted "ASSETS").

Following these questions, participants placed the materials in an envelope and opened a second envelope. The materials in the second envelope asked participants to provide background information, complete several manipulation-check questions, and recall a number of details about the Bransford-Wareham business combination.

IV. RESULTS

Manipulation and Other Checks

This experiment manipulated (1) the method of accounting for a material business combination and (2) the year the business combination occurred. To ensure that participating analysts understood these factors, questions at the end of the second packet of materials asked for details about the items manipulated in the case materials. We also asked analysts to recall the amount of the gross AAP and the amount of AAP Bransford amortized in the most recent fiscal year. Ninety-three percent of the participants correctly indicated the year the business combination occurred, 96 percent correctly identified the accounting method (i.e., purchase vs. pooling), and 96 percent correctly indicated the accounting treatment for the AAP. In addition, 97 percent of the participants correctly indicated that the AAP is not deductible for federal income tax purposes, suggesting that participants understood that there were no direct cash flow differences across conditions. Finally, 93 percent of the participants correctly indicated that the purchase price exceeded the net fair value of Wareham's assets. The mean estimate of the AAP was approximately \$126 million (median of \$129 million), did not differ across conditions ($F = 1.38$, $p = 0.23$), and did not differ from the actual AAP of approximately \$129 million ($p = 0.15$).[15]

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[14] The summary of significant accounting policies stated that the acquirer and target companies represent two distinct industries and that the annual report would provide summary information for their respective operations as industry segments. The separate company information was identical across the POOL, PURCH-GW, PURCH-RD, and PAST/FASB-GW conditions because the summary of significant accounting policies explicitly noted that the profitability information did not include goodwill amortization or the in-process R&D write-off.

Hypothesis Tests

Descriptive statistics for common stock price judgments (PRICE) are reported in Panels A and B of Table 1 and illustrated in Figure 1. As Levene's test suggests significant differences in the variances across the seven conditions ($F = 3.10$, $p < 0.01$), the hypothesis tests are performed using pairwise nonparametric robust rank-order tests.[16]

The first hypothesis predicts a lower PRICE for a company's outstanding common stock when the company amortizes goodwill associated with a purchase-method business combination than when the company uses the pooling method. Consistent with H1, Panels A and C of Table 1 report that the PRICE judgments (across the timing of the business combination) are significantly lower ($\grave{U} = -4.86$, $p < 0.01$, one-tailed) in the PURCH-GW conditions (median = \$13.75) than in the POOL conditions (median = \$15.75). This predicted difference holds within each of the "timing" groups. The PRICE judgments in the PAST/PURCH-GW condition (median = \$9.00) are significantly lower ($\grave{U} = -3.68$, $p < 0.01$, one-tailed) than in the PAST/POOL condition (median = \$15.00). Further, the PRICE judgments in the RECENT/PURCH-GW condition (median = \$14.85) are significantly lower ($\grave{U} = -2.90$, $p < 0.01$, one-tailed) than in the RECENT/POOL condition (median = \$16.40).

The second hypothesis predicts a lower PRICE when the company amortizes goodwill than when the company immediately writes off the entire AAP as IPR&D. Consistent with H2, Panels A and C of Table 1 report that the PRICE judgments in the PURCH-GW conditions (median = \$13.75) are significantly lower ($\grave{U} = -4.58$, $p < 0.01$, one-tailed) than in the PURCH-RD conditions (median = \$15.00). Again, this predicted difference holds within each of the "timing" groups. The PRICE judgments in the PAST/PURCH-GW condition (median = \$9.00) are significantly lower ($\grave{U} = -5.40$, $p < 0.01$, one-tailed) than in the PAST/PURCH-RD condition (median = \$16.50). Further, the PRICE judgments in the RECENT/PURCH-GW condition (median = \$14.85) are marginally lower ($\grave{U} = -1.39$, $p = 0.08$, one-tailed) than in the RECENT/PURCH-RD condition (median = \$15.00).

The third hypothesis predicts a lower PRICE when the company records and amortizes goodwill associated with a business combination that occurred three years ago than when the same business combination occurred one year ago. Panels A and C of Table 1 report that the PRICE judgments in the PAST/PURCH-GW condition (median = \$9.00) are significantly lower ($\grave{U} = -2.27$, $p = 0.01$, one-tailed) than in the RECENT/PURCH-GW condition (median = \$14.85). Consistent with H3, this timing difference occurred only in

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[15] The nonparametric Kruskal-Wallis test also detected no differences across conditions ($\chi^2 = 3.40$, $p = 0.64$). In addition, the results of our hypothesis tests (reported in the next subsection) are inferentially similar when we exclude analysts who incorrectly answered the manipulation check or AAP-related questions.

[16] Consistent with our primary analyses, Figure 1 depicts the medians. All reported robust rank-order test results are inferentially similar to the results obtained through (unreported) Mann-Whitney U tests and parametric t-tests. According to Siegel and Castellan (1988, 137–138), the robust rank-order test makes less stringent distributional assumptions about the sampled population than the Mann-Whitney U test, and may be more appropriate in cases with significant variation in sample variances.

TABLE 1
Analysis of Analysts' Common Stock Price Judgments by Business-Combination Accounting Method and Business-Combination Timing Conditions[a]

Panel A: Median [Mean] PRICE Judgments for Fully Crossed Conditions (Standard Deviation)

	Accounting Method		
Timing	*POOL*	*PURCH-GW*	*PURCH-RD*
PAST	15.00 [15.39] (3.40) n = 18	9.00 [9.24] (5.52) n = 15	16.50 [17.26] (5.98) n = 16
RECENT	16.40 [16.38] (2.61) n = 18	14.85 [13.81] (3.14) n = 17	15.00 [15.26] (2.06) n = 14
Overall Accounting Method	15.75 [15.89] (3.02) n = 36	13.75 [11.67] (4.92) n = 32	15.00 [16.33] (4.63) n = 30

Panel B: Median [Mean] PRICE Judgments for the Ex Ante *PAST/FASB-GW Condition (Standard Deviation)*

PAST/FASB-GW	15.00 [15.10] (5.08) n = 15

Panel C: Nonparametric Pairwise Comparisons[b]

Comparison	*Ù-Statistic*	*p-value*[c]
(H1) Overall PURCH-GW vs. Overall POOL	−4.86	< 0.01
(H2) Overall PURCH-GW vs. Overall PURCH-RD	−4.58	< 0.01
(H3) PAST/PURCH-GW vs. RECENT/PURCH-GW	−2.27	0.01
(H4) PAST/PURCH-GW vs. PAST/FASB-GW	−3.38	< 0.01

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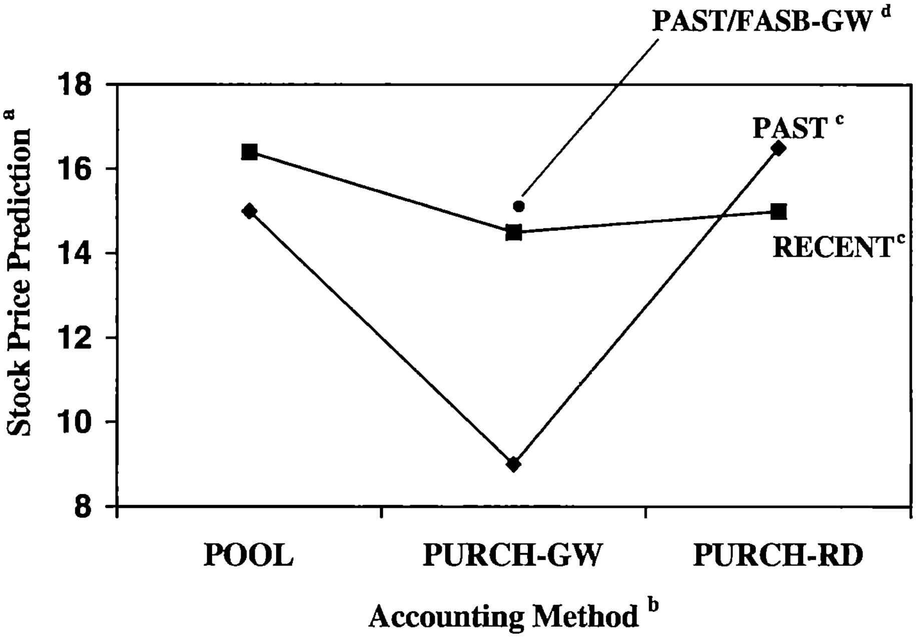
[a] Figure 1 describes the PRICE dependent variable and the accounting method and timing independent variables.
[b] Levene's test suggests that the seven conditions differ in the variances ($F = 3.10$, $p < 0.01$). Therefore, the analyses reported in Panel C use nonparametric robust rank-order tests (Siegel and Castellan 1988). Nonparametric Mann-Whitney U-tests and parametric t-tests yield inferentially similar results.
[c] Predictions are directional, so p-values are one-tailed.

the PURCH-GW condition. As expected, PRICE judgments did not differ significantly across the POOL conditions (RECENT median = \$16.40 vs. PAST median = \$15.00; Ù = 1.09, p = 0.28, two-tailed) or the PURCH-RD conditions (RECENT median = 15.00 vs. PAST median = 16.50; Ù = −1.49, p = 0.14, two-tailed).

The fourth hypothesis predicts that if a company amortizes an AAP from a purchase-method business combination that occurred three years ago, analysts will provide lower PRICE judgments if the company reports AAP amortization in the body of the income

FIGURE 1
Analysts' Common Stock Price Judgments by Business-Combination Accounting Method and Business-Combination Timing Conditions



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[a] Analysts estimated the price of a company's common stock (PRICE) after receiving information about the company and its industry, including an income statement, balance sheet, statement of cash flows, statement of changes in owners' equity, and a summary of significant accounting policies. We held constant all information, except the information directly related to the two independent variables.

[b] The method of accounting for the business combination varied between subjects as (1) pooling of interests ("POOL"), (2) purchase with the accounting acquisition premium (AAP) capitalized as goodwill and amortized over six years ("PURCH-GW"), or (3) purchase with the AAP expensed as in-process research and development ("PURCH-RD"). Because the business combination was consummated via a tax-free exchange of common shares, cash flows were identical across accounting methods.

[c] The business combination either occurred at the beginning of the most recent fiscal year ("RECENT") or at the beginning of the three-years-prior fiscal year ("PAST").

[d] We also constructed a set of PURCH-GW materials that incorporated the FASB's proposed reporting format for presentation of goodwill amortization (i.e., PAST/FASB-GW). Except for modifying the income statement location of goodwill amortization (i.e., immediately preceding net income) and providing a per-share amount for pre-amortization income, the materials were identical to those presented to PAST/PURCH-GW analysts.

statement rather than as a separate subtotal immediately preceding bottom-line net income. Panels A, B, and C of Table 1 report the descriptive statistics and analyses for H4. Consistent with H4, the FASB's proposed goodwill-reporting format appears to mitigate the lower PRICE judgments observed in the PAST/PURCH-GW condition. In particular, PRICE judgments in the PAST/PURCH-GW condition (median = \$9.00) were lower than in the PAST/FASB-GW condition (median = \$15.00; $\check{U} = -3.38$, $p < 0.01$, one-tailed). In contrast, PRICE judgments in the PAST/FASB-GW condition were *not* significantly different from the PAST/POOL ($\check{U} = 0.32$, $p = 0.75$, two-tailed) or PAST/PURCH-RD conditions ($\check{U} = 0.70$, $p = 0.48$, two-tailed).

Return on Assets

After estimating PRICE, participants estimated ROA. Analysis of participants' detailed calculations supporting the numerator (i.e., INCOME) and the denominator (i.e., ASSETS) allowed us to examine whether differences in participants' ROA judgments were consistent with differences in their stock price judgments.[17] Panels A and B of Tables 2 and 3 provide descriptive statistics for INCOME and ROA data, respectively. Because we believed analysts would use Bransford's income in forming their PRICE judgments, we expected the PRICE predictions to also hold for the INCOME and ROA judgments. Therefore we analyzed these data using the same procedures as reported in the previous section. We again used pairwise nonparametric robust rank-order tests because of unequal variances among a number of the comparisons. Results for INCOME and ROA are consistent with those for PRICE, further supporting H1–H4. Because the results for INCOME and ROA are inferentially similar, we discuss only the INCOME results.[18]

Consistent with H1, INCOME judgments in the PURCH-GW conditions (median = $20.9 million) are significantly lower than in the POOL conditions (median = $27.4 million; (Ù = −3.60, $p < 0.01$, one-tailed). As was the case for PRICE judgments, this difference holds across both timing groups. INCOME judgments in the PAST/PURCH-GW condition (median = $10.4) are significantly lower (Ù = −2.89, $p < 0.01$, one-tailed) than in the PAST/POOL condition (median = $27.4). Further, INCOME judgments in the RECENT/PURCH-GW condition (median = $27.4) are significantly lower (Ù = −1.84, p = 0.03, one-tailed) than in the RECENT/POOL condition (median = $27.4).[19]

Consistent with H2, the INCOME judgments in the PURCH-GW conditions (median = $20.9 million) are significantly lower than in the PURCH-RD conditions (median = $27.4 million; Ù = −3.12, $p < 0.01$, one-tailed). The INCOME judgments in the PAST/PURCH-GW condition (median = $10.4) are significantly lower (Ù = −3.83, $p < 0.01$, one-tailed) than in the PAST/PURCH-RD condition (median = $27.4). However, the INCOME judgments in the RECENT/PURCH-GW condition (median = $27.4) are not significantly different (Ù = −.96, p = 0.17, one-tailed) from the RECENT/PURCH-RD condition (median = $27.4).

Consistent with H3, the INCOME judgments in the PAST/PURCH-GW condition (median = $10.4) are significantly lower (Ù = −1.85, p = 0.03, one-tailed) than in the RECENT/PURCH-GW condition (median = $27.4). As expected, however, INCOME judgments did not differ significantly across the POOL conditions (RECENT median = $27.4 vs. PAST median = $27.4; Ù = −0.04, p = 0.97, two-tailed) or the PURCH-RD

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[17] Because there is no clear benchmark for analyzing analysts' ASSETS judgments, we do not discuss these results in detail. Inspection of analysts' ROA explanations reveals great disparity in whether participants used year-end assets or a multiple-year average level of assets. Indeed, all analysts' mean and median ASSETS judgments fell between Bransford's reported total assets for the two most recent fiscal years. Therefore, we focus on analysts' INCOME and ROA judgments.

[18] The comparatively low mean INCOME and ROA judgments (reported in Panel A of Tables 2 and 3, respectively) in the RECENT/PURCH-RD conditions is attributable to two analysts who included Bransford's unadjusted net loss (i.e., loss = $101.9 million) in the numerators of their ratios. The following discussion, which reports median INCOME values, mitigates the influence of the two outlying negative INCOME amounts and is consistent with the previously reported PRICE comparisons. All reported robust rank-order test results are inferentially similar to the results obtained from (unreported) Mann-Whitney U tests and parametric t-tests.

[19] The robust rank-order tests suggest that the RECENT/PURCH-GW INCOME judgment is lower than the RECENT/POOL judgment, even though the medians for both conditions are $27.4 million. This result occurs because the robust rank-order test is not a test of medians. Rather, the procedure tests for differences in location (i.e., differences in ranks of the dependent variable).

TABLE 2
Analysis of Analysts' INCOME Judgments by Accounting Method and Timing Conditions[a]

Panel A: Median [Mean] INCOME Judgments (Standard Deviation)—in $million, except for n[b]

	Accounting Method		
Timing	*POOL*	*PURCH-GW*	*PURCH-RD*
PAST	27.4	10.4	27.4
	[27.6]	[18.1]	[33.4]
	(2.1)	(17.0)	(9.3)
	n = 18	n = 15	n = 16
RECENT	27.4	27.4	27.4
	[27.8]	[23.6]	[8.7]
	(1.2)	(9.1)	(49.5)
	n = 17	n = 15	n = 13
Total Accounting Method	27.4	20.9	27.4
	[27.7]	[20.8]	[22.3]
	(1.7)	(13.7)	(35.4)
	n = 35	n = 30	n = 29

Panel B: Median [Mean] INCOME Judgments for the Ex Ante *PAST/FASB-GW Condition (Standard Deviation)*

PAST/FASB-GW	27.4
	[29.6]
	(6.2)
	n = 15

Panel C: Nonparametric Pairwise Comparisons[c]

Comparison	*Ù-Statistic*	*p-value*[d]
(H1) PURCH-GW vs. POOL	−3.60	< 0.01
(H2) PURCH-GW vs. PURCH-RD	−3.12	< 0.01
(H3) PAST/PURCH-GW vs. RECENT/PURCH-GW	−1.85	0.03
(H4) PAST/PURCH-GW vs. PAST/FASB-GW	−3.51	< 0.01

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[a] Figure 1 describes the accounting method and timing independent variables.

[b] We asked analysts to calculate Bransford's return on assets ("ROA") in a manner consistent with "how [they] would compute ROA to evaluate Bransford's current performance and its future prospects." We indicated that we were interested in the specific items that different analysts include in the ratio, so we also asked analysts to specify their "supporting adjustments and computations" for the numerator and denominator of the ROA ratio. This allowed us to examine whether participants adjusted reported income for goodwill amortization (ROA numerator is denoted as "INCOME") and whether they adjusted reported assets for the asset goodwill (ROA denominator is denoted "ASSETS"). The descriptive statistics for ROA data appear in Table 3.

[c] Table 1 describes the nonparametric procedures used in this analysis.

[d] Predictions are directional, so p-values are one-tailed.

TABLE 3
Descriptive Statistics for Analysts' ROA Judgments by Accounting Method and Timing Conditions[a]

Panel A: Median [Mean] ROA Judgments (Standard Deviation)—percentage, except for n

	Accounting Method		
Timing	*POOL*	*PURCH-GW*	*PURCH-RD*
PAST	5.90	2.50	6.10
	[5.92]	[3.68]	[7.84]
	(1.06)	(3.26)	(2.92)
	n = 18	n = 15	n = 16
RECENT	6.00	5.85	5.90
	[6.19]	[5.41]	[0.93]
	(1.22)	(2.17)	(14.07)
	n = 17	n = 16	n = 14
Overall Accounting Method	5.90	4.83	6.09
	[6.05]	[4.57]	[4.62]
	(1.11)	(2.84)	(10.27)
	n = 35	n = 31	n = 30

Panel B: Median [Mean] ROA Judgments for the Ex Ante *PAST/FASB-GW Condition (Standard Deviation)*

PAST/FASB-GW	5.90
	[6.48]
	(2.13)
	n = 15

Panel C: Nonparametric Pairwise Comparisons[b]

Comparison	*Ù-Statistic*	*p-value[c]*
(H1) PURCH-GW vs. POOL	−2.58	< 0.01
(H2) PURCH-GW vs. PURCH-RD	−2.92	< 0.01
(H3) PAST/PURCH-GW vs. RECENT/PURCH-GW	−2.26	0.01
(H4) PAST/PURCH-GW vs. PAST/FASB-GW	−3.51	< 0.01

[a] Table 2 describes the ROA dependent variable and Figure 1 describes the accounting method and timing independent variables.

[b] Table 1 describes the nonparametric procedures used in this analysis.

[c] Predictions are directional, so p-values are one-tailed.

conditions (RECENT median = \$27.4 vs. PAST median = \$27.4; Ù = −1.45, p = 0.15, two-tailed).[20]

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[20] We also tested H3 using a two factor (3 × 2) ANOVA on the rank-transformed PRICE, INCOME, and ROA data (Conover 1980, 337). The interaction between the accounting method and the timing of the business combination parsimoniously summarizes the three comparisons used to test H3. The interaction is marginally significant for both PRICE (F = 2.90, p = 0.06) and INCOME (F = 2.26, p = 0.09), and significant for ROA (F = 5.69, p < 0.01). For all three variables, an analysis of each of the three accounting methods confirms that only the PURCH-GW treatment is differentially affected by timing.

INCOME estimates in the PAST/FASB-GW condition exhibited a similar pattern of results as the PRICE judgments. Consistent with H4, the PAST/PURCH-GW condition (median = \$10.4 million) generated lower INCOME judgments ($\grave{U} = -3.51$, $p < 0.01$, one-tailed) than the PAST/FASB-GW condition (median = \$27.4 million). In contrast, the INCOME judgments in the PAST/FASB-GW condition did not differ significantly from those reported in the PAST/POOL condition ($\grave{U} = 1.13$, $p = 0.26$, two-tailed) and the PAST/PURCH-RD condition ($\grave{U} = 0.82$, $p = 0.41$, two-tailed). Collectively, the PRICE, INCOME, and ROA results for the PAST/FASB-GW condition suggest that the FASB's plan to require companies to report pre-goodwill-amortization income has the potential to mitigate the lower stock prices that can occur when companies amortize goodwill under the purchase method, perhaps because it facilitates analysts' use of pre-amortization income when making price judgments.[21]

Potentially Confounding Factors

Our inferences are based on our expectations that manipulating (1) the accounting for a business combination and (2) the timing of that combination causes analysts to include predictably different income statement information in fundamental-analysis activities. This in turn leads them to develop predictably different stock-price judgments. Unfortunately, we cannot provide conclusive support for these expectations because we could not observe participants' cognitive processes. The complex nature of the accounting issue addressed in our study raises the possibility of competing (i.e., confounding) explanations for our results. We now describe two of these competing explanations and then provide evidence that reduces the likelihood that these factors significantly affected our inferences.

Although we were careful to maintain the same levels of direct cash flows and pre-acquisition-premium net income across all conditions, one potentially confounding factor is that our timing and accounting-method manipulations caused materially different *trends* in reported financial statement accounts. For example, in the PAST/FASB-GW, PAST/PURCH-GW, PAST/PURCH-RD, and both of the POOL conditions, all three years of income statement data include the combined results of the two companies. In contrast, the RECENT/PURCH-GW and RECENT/PURCH-RD conditions only report combined information for the two companies in the most recent year, and acquirer-only information for the preceding two years.

Another potentially confounding factor is that analysts and investors might believe that the company's choice of business-combination accounting method or the way the company treated the AAP provided a value-relevant signal. For example, these choices might signal managers' private information. While we control for the direct cash flow effects of accounting treatment (i.e., a tax-free, stock-for-stock transaction), the lower post-combination reported income under the purchase method might cause managers to alter their behavior, indirectly affecting future cash flows. Indeed, one of the factors that motivates firms to forgo pooling accounting is the desire to continue (or initiate) share buy-back programs, which are allowed only under purchase accounting. Alternatively, business-combination accounting may affect performance-based compensation contracts that rely on accounting measures.

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[21] Comparing analysts' INCOME judgments to Bransford's reported net income and pre-AAP-charge income indicates the extent to which analysts removed AAP charges from their estimates of value relevant income. Bransford's most recent year's reported net income in each of the conditions follows (all in millions): PAST/POOL = \$27.4, PRESENT/POOL = \$27.4, PAST/PURCH-GW = \$5.9, PRESENT/PURCH-GW = \$5.9, PAST/PURCH-RD = \$27.4, PRESENT/PURCH-RD = −\$101.9, and PAST/FASB-GW = \$5.9. Net income before AAP charges—in all seven conditions—was \$27.4 million in the most recent fiscal year. Of the median INCOME data presented in Panels A and C of Table 2, only the PAST/PURCH-GW condition judgment differed from \$27.4. In fact, based on the nonparametric sign test, median INCOME in the PAST/PURCH-GW condition is statistically *greater* than reported net income of \$5.9 million ($p < 0.01$, two-tailed) and statistically *lower* than net income before goodwill amortization of \$27.4 million ($p < 0.01$, two-tailed). Interestingly, median INCOME for the RECENT/PURCH-GW condition is significantly higher than reported net income of \$5.9 million ($p < 0.01$, two-tailed), but is not statistically different from net income before goodwill amortization of \$27.4 million ($p = 0.29$, two-tailed). Inferences from parametric t-tests are similar. These results are consistent with the conventional wisdom that analysts prefer to value companies based on pre-AAP-charge income (e.g., White et al. 1997, 780). However, these results are also consistent with managers' fears that the income-statement effects of the AAP become less noticeable through time (e.g., AT&T's managers in Lys and Vincent [1995]), thereby reducing the likelihood that analysts will use pre-goodwill-charge income in their valuation judgments.

While our manipulations simultaneously changed the most recent year and the overall trend of reported information, supplemental evidence suggests that the difference in the reported trend did not affect our inferences. First, the Appendix shows that the financial information for the PAST/FASB-GW and PAST/PURCH-GW conditions were identical except for two factors. The first was the location of the goodwill-amortization line item in the income statement and the second was the inclusion of a pre-amortization EPS figure in the PAST/FASB-GW condition. Despite identical trends in the reported information, analysts' stock-price and net-income judgments differed significantly across the two conditions. This result indicates that even when the trend is held constant, the format of the financial statements has the predicted effect on analysts' judgments. Further comparison of these two conditions also counters a signaling-based explanation of our results. In particular, significant format-based differences *were* obtained even though the method of accounting and disposition of the AAP were held constant across the conditions.

Additional evidence that is inconsistent with a trend explanation comes from a POOL condition not reported in the tables. We collected data for an additional pooling condition because, at the time we designed this study, we were concerned that we might be unable to adequately explain unexpected results involving the POOL conditions. Because financial reporting for pooling-of-interests transactions requires the combined entity to restate all prior years as if the companies were always combined, the RECENT/POOL condition and all of the PAST conditions report three years of combined income-statement information. However, the remaining two conditions report only one year of combined information. This difference could have had significant implications. For example, if RECENT/POOL judgments unexpectedly differed from RECENT/PURCH-RD, we would have been unable to identify the cause of the difference (i.e., accounting method vs. number of years of combined financial information).

The additional POOL condition provided analysts with (non-GAAP) pro forma financial statements that included combined results for the most recent year, but included acquirer-only income statements for the previous two years (denoted RECENT/POOL-MOD). This modified POOL condition included the same number of periods of combined financial information as the other two RECENT conditions. The average PRICE judgments (median = 15.00; mean = 15.55) of the 15 analysts who completed the RECENT/POOL-MOD materials were not statistically different (lowest $p > 0.30$) from the other POOL or RECENT conditions. In addition, the average INCOME judgments (median = \$27.4 million; mean = \$28.5 million) of the analysts who completed the RECENT/POOL-MOD materials were not statistically different (lowest $p > 0.35$) from the other POOL or RECENT conditions. Therefore, despite including only one year of combined income statement data in the RECENT/POOL-MOD condition, analysts' price and net income judgments were not different from those in the conditions that included three years of combined information.

To provide additional evidence concerning a signaling-based explanation of our results, we reviewed the stock-price explanations analysts provided. To the extent analysts believed that the accounting method or the treatment of the AAP signals private information about the company, we would expect some mention of these items in their explanations. A review of analysts' PRICE explanations reveals that *none* of our participants mentioned the method of business-combination accounting, the existence of performance-based contracts, the potential for share buy-back programs, or the treatment of the AAP. While this analysis provides only negative assurance about the potential influence of signaling, it is consistent with the absence of explicitly perceived accounting-based signals in prior experimental research (Hopkins 1996, 41–42; Hodge et al. 2000).

To address the possibility that stock price differences were attributable to differences in perceived *indirect* cash flows, we provide evidence that differences in analysts' stock price judgments were not attributable to differences in expected future cash flows. Participants responded, on a 15-point scale, to the following question: "I believe Bransford's cash flows from operating activities will be ____ in fiscal 2000 as compared to fiscal 1999" (1 = 50 percent lower; 8 = The same; 15 = 50 percent higher). Responses did not differ across the seven experimental conditions ($F = 0.57$, $p = 0.76$), with responses ranging from 8.92 to 9.74. Collectively, these supplemental analyses suggest that analysts' judgments were most likely based on fundamental analysis of the most recent year of reported results and that (1) the overall trend in the reported data, (2) accounting-based signaling, and (3) differences in perceived future cash flows did not directly affect analysts' PRICE, INCOME, or ROA judgments.

V. CONCLUSION

Contribution

We investigated whether (1) the method of accounting for business combinations and (2) the number of periods reported after completion of business combinations predictably affect financial analysts' stock-price judgments. Consistent with our expectations, analysts' price judgments were lowest when the company applied purchase accounting and ratably amortized goodwill. Analysts estimated higher prices when the company applied either pooling-of-interest accounting or purchase accounting with immediate write-off of the acquisition premium as in-process research and development.

The results of the timing manipulation supported our salience-based predictions. Analysts' stock price estimates were lowest when the company acquired its subsidiary *three years* before the current fiscal year, applied the purchase method, and ratably amortized goodwill. When the business combination occurred in the *most recent* fiscal year, purchase accounting with goodwill amortization resulted in stock-price judgments that were (1) higher than when the company applied the same method of accounting to a three-year-old business combination, (2) lower than each case (i.e., one year and three years after the combination) of pooling-of-interest accounting, and (3) lower than each case of purchase accounting with immediate write-off of the acquisition premium as in-process research and development. In addition, regardless of the timing of the business combination, analysts' price judgments did not statistically differ between pooling-of-interest accounting and purchase accounting with immediate write-off of the acquisition premium as in-process research and development.

We also tested the proposed goodwill-amortization-reporting format described in the FASB's business-combinations exposure draft (FASB 1999b). When the business combination occurred three years ago, analysts who received income statements that included the FASB's proposed pre-goodwill-amortization net income subtotal (and a corresponding earnings per share figure) provided higher stock-price judgments than analysts who received income statements with the traditional goodwill-amortization format. In addition, the stock-price estimates of analysts using the FASB's proposed goodwill-amortization format were not different from the prices provided by analysts when the company applied pooling accounting or when the company applied purchase accounting and wrote off the entire acquisition premium as in-process research and development.

To provide evidence about a potential cause of differences in analysts' price judgments, we examined analysts' estimates of the company's net income and return on assets ("ROA") that can be used to "evaluate [the combined company's] current performance and its future prospects" (i.e., a proxy for value-relevant net income). The patterns of analysts' net income and ROA estimates were qualitatively similar to their stock-price estimates, suggesting that the observed differences in analysts' price judgments were most likely attributable to the amount of acquisition-premium amortization included in analysts' estimates of value-relevant net income. When the business combination was accounted for as a pooling, analysts did not appear to impute a charge for goodwill amortization. When the business combination was accounted for as a purchase, analysts appeared to "back out" expenses related to the acquisition premium when those charges were salient. When amortization was least salient (i.e., in a three-year-old business combination under the purchase method where goodwill amortization was presented in its traditional format), analysts included much of the acquisition-premium amortization in their net-income estimates. In contrast, when analysts received income statements with the FASB's proposed subtotal for pre-goodwill-amortization net income and earnings per share (FASB 1999b), most analysts' net-income estimates did not include a charge for goodwill amortization. Because analysts across all conditions accurately recalled details about the acquisition premium, our results likely cannot be explained by analysts' "forgetting" about the business combination (Palepu 1987, 88).

This study has implications for accounting standard setters, accounting educators, and users and preparers of financial accounting information. As financial intermediaries, analysts are important consumers of accounting information. We extend both Hopkins (1996) and Hirst and Hopkins (1998) by demonstrating that fundamental variation in accounting method—in this case, accounting for business combinations—has a predictable effect on analysts' stock-price estimates and the amount of value-relevant net income included in their valuation models. This study also provides evidence on a vital question in accounting research—does how we account for things make a difference? In so doing, we provide *ex ante* evidence on likely effects of the FASB's proposed changes to accounting for business combinations.

Compared to ratable amortization over a period of years, our results suggest that analysts are more likely to remove from reported net income the effects of large, one-time charges. These results are consistent with managers' recent increased use of one-time charges (Elliott and Hanna 1996). Firms' recent preference for large in-process research and development write-offs is analogous to the popular choice of the one-time transition adjustment when companies adopted SFAS No. 106, *Employers' Accounting for Post-Retirement Benefits other than Pensions* (FASB 1990). Rather than capitalizing and amortizing the transition adjustment, most firms adopting SFAS No. 106 immediately charged to expense the entire amount (Williams 1995; Amir and Livnat 1996). Our results illustrate the potential benefits of this expense recognition policy. Compared to ratable amortization that causes prolonged reduction of reported earnings, analysts are more likely to discount the effects of a noncash charge if it is presented as a one-time item.

Caveats

Like all research, our study is subject to limitations. Similar to Hopkins (1996) and Hirst and Hopkins (1998), analysts' stock price judgments are simple averages across analysts in each condition. Therefore, these price estimates may not be indicative of market-determined prices. Even if markets can mitigate the effects documented in this study, however, analysts' valuation judgments warrant investigation because they are an important input into institutional investors' portfolio-management decisions.

We also restricted the amount of information provided to each analyst and did not allow analysts to seek value-relevant information from other sources. We intentionally limited the amount of information to provide analysts with a task that could be completed in a reasonable amount of time, thereby increasing the likelihood that analysts would participate. This design choice is potentially important because survey results suggest that buy-side analysts obtain information from many sources, including company management and other analysts (SRI International 1987).

Finally, because we administered the experiment via mail, we cannot be sure that participants complied with our instructions asking them not to refer to the contents of the first envelope when completing the second envelope's materials. Participants also could have modified their responses to the questions in the first envelope after completing the materials in the second envelope. Although we did not detect evidence that analysts changed their responses (e.g., eraser marks or crossed-out responses), our mailing procedure cannot eliminate the possibility that uncontrolled, extraneous factors affected our results.

APPENDIX
Income Statement Information Included in the Experimental Materials

Panel A: PAST/PURCH-GW Income Statement[a]

	1999	*1998*	*1997*
Revenues			
Sales of Goods	$450,784	$414,466	$385,872
Costs and Expenses			
Cost of goods sold	300,998	275,781	256,658
Selling general and administrative expenses	89,040	83,579	78,156
Research and development	11,519	10,272	9,723
Goodwill amortization[c]	21,563	21,563	21,563
Interest and other financing costs, net	6,933	6,976	7,125
Total costs and expenses[d]	430,053	398,171	373,225
Earnings from continuing operations before tax	20,731	16,295	12,647
Provision for Income Taxes	14,845	13,288	12,008
Net Income[c]	**$ 5,886**	**$ 3,007**	**$ 639**
Earnings per Share[e]	**$0.21**	**$0.11**	**$0.02**
Weighted Average Shares	27,500	27,500	27,500

Panel B: RECENT/PURCH-GW Income Statement[b]

	1999	1998	1997
Revenues			
Sales of Goods	$450,784	$313,310	$287,094
Costs and Expenses			
Cost of goods sold	300,998	214,654	196,340
Selling general and administrative expenses	89,040	63,154	57,942
Research and development	11,519	7,125	6,524
Goodwill amortization[f]	21,563	—	—
Interest and other financing costs, net	6,933	5,441	5,520
Total costs and expenses[g]	430,053	290,374	266,326
Earnings from continuing operations before tax	20,731	22,936	20,768
Provision for Income Taxes	14,845	8,051	7,290
Net Income[h]	**$ 5,886**	**$ 14,885**	**$ 13,478**
Earnings per Share[h]	**$0.21**	**$0.76**	**$0.69**
Weighted Average Shares	27,500	19,500	19,500

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[a] The income statement from the PAST/PURCH-GW condition is presented as an example of the five experimental conditions that include three years of combined information for the acquirer and target firms. The other four conditions are RECENT/POOL, PAST/POOL, PAST/PURCH-RD, and PAST/FASB-GW.

[b] The income statement from the RECENT/PURCH-GW condition is presented as an example of the two experimental conditions that include one year of combined information for the acquirer and target firms and two years of acquirer-only information. The other condition is RECENT/PURCH-RD.

[c] The RECENT/POOL and PAST/POOL conditions did not include goodwill amortization. The PAST/PURCH-RD included a line item for "write-off of acquired in-process research and development" ($0, $0, and $129,380 in 1999, 1998, and 1997, respectively) instead of "goodwill amortization." The PAST/FASB-GW condition included the same line item for "goodwill amortization," but it was presented before "income from continuing operations" (a new subtotal presented after taxes, but before net of tax amortization).

[d] Because of differences in reporting the accounting acquisition premium (AAP), "total costs and expenses" differed between some of the conditions. In the PAST/FASB-GW and both POOL conditions, this line item was $408,490, $376,608, and $351,662 in 1999, 1998, and 1997, respectively. In the PAST/PURCH-RD condition, this line item was $408,490, $376,608, and $481,042 in 1999, 1998, and 1997, respectively.

[e] Because of differences in reporting the accounting acquisition premium (AAP), "net income" and "earnings per share" differed between some of conditions. As these two items reflect the same underlying trends, only differences in EPS are discussed in this note. In both POOL conditions, EPS was $1.00, $0.89, and $0.81 in 1999, 1998, and 1997, respectively. In the PAST/PURCH-RD condition, EPS was $1.00, $0.89, and −$3.90 in 1999, 1998, and 1997, respectively. In the PAST/FASB-GW condition, the income statement included an additional line item called "per share income from continuing operations" for $1.00, $0.89, and $0.81 in 1999, 1998, and 1997, respectively.

[f] The RECENT/PURCH-RD condition included a line item for "write-off of acquired in-process research and development" ($129,380 in 1999) instead of "goodwill amortization."

[g] Because of differences in reporting the AAP, "total costs and expenses" was $537,870 in the RECENT/PURCH-RD condition in 1999.

[h] Because of differences in reporting the AAP, 1999 "net income" (−$101,931) and "earnings per share" (−$3.71) differed in the RECENT/PURCH-RD condition.

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The Balanced Scorecard: Judgmental Effects of Common and Unique Performance Measures

Marlys Gascho Lipe
University of Oklahoma
Steven E. Salterio
University of Waterloo

ABSTRACT: The balanced scorecard is a new tool that complements traditional measures of business unit performance. The scorecard contains a diverse set of performance measures, including financial performance, customer relations, internal business processes, and learning and growth. Advocates of the balanced scorecard suggest that each unit in the organization should develop and use its own scorecard, choosing measures that capture the unit's business strategy. Our study examines judgmental effects of the balanced scorecard—specifically, how balanced scorecards that include some measures common to multiple units and other measures that are unique to a particular unit affect superiors' evaluations of that unit's performance. Our test shows that only the common measures affect the superiors' evaluations. We discuss the implications of this result for research and practice.

Key Words: *Balanced scorecard, Performance measures, Performance evaluation.*

Data Availability: *Data are available from the second author.*

I. INTRODUCTION

Kaplan and Norton (1992) developed the balanced scorecard (BSC) to complement traditional financial measures of business unit performance. A recent survey estimates 60 percent of Fortune 1000 firms have experimented with the BSC (Silk

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1998). Adopters include KPMG Peat Marwick, Allstate Insurance, and AT&T (Chow et al. 1997).

The BSC contains a diverse set of performance measures, spanning financial performance, customer relations, internal business processes, and the organization's learning and growth activities (Kaplan and Norton 1992). This large set of measures is designed to capture the firm's desired business strategy (Kaplan and Norton 1993, 1996a) and to include drivers of performance in all areas important to the firm. Use of the BSC should improve managerial decision making by aligning performance measures with the goals and strategies of the firm and the firm's business units.

The BSC is relatively costly to develop[1] so the net benefits gained in adopting the BSC depend on the extent to which it improves managers' decisions. In this study, we explore how managers' cognitive limitations may prevent an organization from fully benefiting from the BSC's information. We examine observable characteristics of the BSC (i.e., measures common to multiple units vs. measures unique to particular units) that may limit managers' ability to fully exploit the information found in a diverse set of performance measures.

Each business unit in the organization develops its own BSC measures to reflect its goals and strategy. While some of these measures are likely to be common across all subsidiaries or units, other measures will be unique to each business unit (Kaplan and Norton 1996b). Judgment and decision-making research suggests that decision makers faced with both common and unique measures may place more weight on common measures than unique measures (Slovic and MacPhillamy 1974). Therefore, managers evaluating multiple subordinate units (i.e., superior managers) may underuse or even ignore the unique measures designed for each unit. Judgmental difficulties in using unique measures may be compounded when the manager who carries out a unit's performance evaluation does not actively participate in developing that unit's scorecard and, consequently, may not appreciate the significance of the unique measures. Underuse of unique measures reduces the potential benefits of the BSC because the unique measures are important in capturing the unit's business strategy.

To investigate whether common measures dominate BSC-based evaluations of subordinate units, we develop an experiment where M.B.A. students evaluate two divisions of a clothing firm. The two divisions sell to different markets and have different business strategies. They have balanced scorecards with some common and some unique measures. We manipulate the performance of the two divisions (relative to their targets) on their common and unique measures in a crossed design. Division one may outperform (or underperform) division two on common measures, and division one may also outperform (or underperform) division two on unique measures. Our results show that the experimental participants evaluate the divisions based solely on the common measures. Performance on unique measures has no effect on the evaluation judgments.

Our study is the first to document a cognitive difficulty in using the BSC, and our result that superior managers appear to disregard unique measures in performance evaluations has implications for managers and firms using the BSC. If unique measures do not affect subordinates' *ex post* performance evaluations, then the subordinate manager is unlikely to use unique measures in *ex ante* decision making (Holmstrom and Milgrom 1991). In addition, Kaplan and Norton (1996b) note that measures that are common across units often tend to be lagging and financial indicators of performance. In contrast, unique measures are more often leading and nonfinancial measures. Consequently, our results suggest that managers may pay insufficient attention to leading and nonfinancial measures. This defeats the purpose of implementing the BSC, which is to expand the set of measures that managers use in decision making (Kaplan and Norton 1996b). If the unique measures on the scorecard do not affect managers' decisions, firms will not reap the expected benefits of BSC adoption.

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[1] Management time is one element of this cost. Kaplan and Norton (1996b) estimate that development could take as little as 16 weeks, but Chow et al. (1997) and Kaplan and Norton (1996a) indicate development and implementation can require a significant time investment for two years or more.

The remainder of the paper is organized as follows. The next section describes the BSC and its use, as envisioned by Kaplan and Norton (1996b). In Section III we review the judgment and decision-making literature applicable to the study of the BSC and develop our research hypothesis. Sections IV and V describe the experimental method and results, and the final section discusses the implications and limitations of the study.

II. THE BALANCED SCORECARD

Implementation

Kaplan and Norton's (1996b) best-selling book provides a blueprint for organizations interested in implementing a BSC. The BSC is an integrated set of leading and lagging performance measures designed to capture the organization's strategy. Kaplan and Norton (1996a, 1996b) identify four major steps in implementing a BSC: (1) clarifying and translating the vision and strategy, (2) communicating and linking, (3) planning and target setting, and (4) strategic feedback and learning.

The first step, clarifying and translating the vision and strategy, is generally accomplished by a team of upper management, although Kaplan and Norton (1996b) indicate that this has been successfully accomplished by a single senior executive. The purpose of this phase is to develop an understanding of the firm's mission and strategy for obtaining its goals. Since mission statements are often vague, management must translate the mission into specific objectives and then develop a strategy that will use the firm's strengths to meet the objectives. In doing so, management should develop a set of measures that captures this strategy. This will become the organization's BSC.

After the firm's BSC has been developed, each strategic business unit determines measures for its own scorecard as part of the communicating and linking step. Unit managers consider both the overall organizational objectives and strategy and their own units' business strategy. The measures chosen for the unit's BSC should describe what the unit must do to accomplish its strategy, which will in turn help the organization accomplish its objectives. Kaplan and Norton (1993, 135) state that the measures on the unit's scorecard should be specifically designed to fit the unit's "mission, strategy, technology, and culture." For example, when Mobil Corp.'s Americas Marketing and Refining division showed its unit leaders the division's BSC, the leaders were told: "Develop a set of strategic objectives and measures that represent the direction of your business. Here's a copy of the division's scorecard, but don't worry about making yours a carbon copy" (McWilliams 1996, 18). Similarly, in discussing the directions given to divisional managers at FMC Corporation, executive vice president Larry Brady stated, "We definitely wanted the division managers to perform their own strategic analysis and to develop their own measures" (Kaplan and Norton 1993, 145).

In the normal course of a BSC implementation, each unit manager (and his or her team) develops that unit's scorecard, while higher-level managers approve the scorecards and use them for evaluation and further decision making. Chow et al. (1997) indicate that even small businesses develop multiple scorecards, each tailored to the strategy and goals of a specific subunit. Thus, the second step of BSC implementation requires many people in units throughout the organization to develop scorecards for their particular segments of the business.

In the remaining steps of BSC implementation, managers set targets and budgets (step three), and over time, receive feedback on the strategies of the business units and the firm by evaluating performance relative to the scorecard measures (step four). These activities parallel those performed in non-BSC firms so we do not discuss them in detail. We now describe the types of performance measures included in the BSC.

Categories of Measures

The BSC should include measures of financial performance, customer relations, internal business processes, and organizational learning and growth (Kaplan and Norton 1996b). As discussed above, some of the specific measures chosen for each individual business unit in the organization will likely differ from those of other units, because the measures should be tailored to each unit's specific goals and strategies.

Financial measures can include traditional measures such as return on assets and net income, but Kaplan and Norton (1996b) advocate measures that are particularly relevant to the business unit (e.g., revenues per employee for a sales unit or research and development expense/sales for a pharmaceutical division). Measures related to customers include results of customer surveys, sales from repeat customers, and customer profitability. Internal business process measures relate specifically to the operational processes of the business unit. For example, a petroleum distributor may measure dealer acceptance of new distributor programs and dealer quality (Kaplan and Norton 1996b, 111–113). The final set of performance measures relates to learning and growth and they are often the most difficult to select. Kaplan and Norton (1996b, 127) suggest measures of employee capabilities, information systems capabilities, and employee motivation and empowerment.

Linking the BSC to Performance Evaluation and Compensation

Kaplan and Norton (1996b, 217–223) indicate that it is problematic to ask managers to focus on BSC measures if managers' compensation and evaluation are based on traditional financial measures. However, Kaplan and Norton (1996b) do not provide specific recommendations regarding how to link the BSC to compensation.[2] In light of Kaplan and Norton's (1996b) reticence on the link between the BSC and compensation, our experiment investigates the use of the BSC for performance measurement and evaluation, rather than for compensation. Kaplan and Norton (1996b, 1996a) indicate that managers will use the BSC for performance evaluation during operational reviews. Operational reviews of performance using the BSC are similar to those in non-BSC firms (i.e., a manager evaluates subordinate units and unit managers) except that the BSC provides the evaluating manager with a broader set of measures (including nonfinancial measures) to use in assessing subordinates' performance. Thus, we consider the effect of this broader set of measures in the context of an organization's performance review and evaluation.

The BSC is a relatively complex and costly measurement system. It is important to understand how cognition affects use of the BSC in order to understand how managers' cognitive capabilities and characteristics may limit the BSC's potential benefits. The next section reviews judgment and decision-making research relevant to assessing managers' abilities to process and use the BSC information.

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[2] Chow et al. (1997) and McWilliams (1996) argue that it is important to link the BSC measures with compensation, although the firm may want to use the scorecard for some time before establishing the link. Major firms including CIGNA Insurance and Sears Roebuck, have reportedly linked employee compensation with corporate or business unit scorecard performance (Epstein and Manzoni 1997; Rucci et al. 1998).

III. JUDGMENT AND DECISION-MAKING RESEARCH

The Use of Common and Unique Information

Kaplan and Norton (1996b) argue that an important strength of the BSC is that each business unit in the organization will have its own scorecard specifically tailored to that unit. Yet Kaplan and Norton (1996b, 149) also note that all balanced scorecards are likely to use "certain generic measures." Thus, units at the same organizational level will have some common measures in addition to others that are unique to their business and strategy. Since operational reviews of performance typically occur at regular intervals (e.g., quarterly), the superior manager makes evaluations of multiple subordinate units (and their managers) within a short time frame, based on both common and unique measures.

A classic judgment and decision-making study suggests that people use common and unique information differently. Slovic and MacPhillamy's (1974) undergraduate volunteer participants judged which of two college students had the higher freshman GPA. The experimental subjects based their judgments on numerical information regarding the students' English skills, quantitative aptitude, and need for achievement. Participants saw some information that was common to the two college students and other unique information. For example, the material could provide scores on English skills for both students, a quantitative aptitude score for student one, and a need for achievement score for student two. The participants saw such information for pairs of students and judged which student would have the higher freshman GPA and the magnitude of the difference. Slovic and MacPhillamy (1974) found that participants weighted the common measures more heavily than unique measures for both the judgment and the choice. Monetary incentives and feedback did not eliminate this differential weighting. Further, the effect did not result from differential diagnosticity of the common and unique items; another group of participants who predicted the GPAs when each student's information was presented individually (i.e., no comparison case was given) did not weight the information items differentially.

Slovic and MacPhillamy (1974) argue that common information has a greater impact because it is easier to use in comparing the candidates. This suggests that evaluators in a BSC firm, faced with common and unique measures across business units, may concentrate on the common measures to simplify their judgment task (Payne et al. 1993). However, there are several reasons why this emphasis on common measures may not occur in the context of BSC evaluations.

Although Slovic and MacPhillamy (1974) find that common measures dominate unique measures, the dominance is not very large. Slovic and MacPhillamy (1974, 184) report that, for their comparative judgments, the average weight placed on common measures is 0.395 and on unique measures is 0.342. The authors also note a potential confound in their tests (Slovic and MacPhillamy 1974, 189). In many of the pairs of hypothetical students, a decision strategy of weighting each piece of information equally would lead to the same choice as a decision strategy based on only the common measures. Thus, although Slovic and MacPhillamy (1974) conclude that common measures are dominant for comparative judgments, the magnitude of dominance is small and the results cannot be interpreted unambiguously.

Furthermore, Slovic and MacPhillamy's (1974) results may not obtain in the BSC context if superior managers evaluate each business unit and unit manager *individually*.

Each of the units has a scorecard with measures tailored to its strategy, along with targets for those measures that are also tailored to the unit's business environment. The superior manager is *not* asked to directly compare the units or subordinate managers in making evaluation judgments. In Slovic and MacPhillamy's (1974) study common measures dominated only for comparative judgments. Thus, if the superior managers judge each business unit individually, they may not weight the common measures more heavily.

Further, in Slovic and MacPhillamy's (1974) study, participants did not have any *particular* knowledge regarding the importance of the three items of information (e.g., English skills). In contrast, the superior manager in a BSC firm knows the subordinate business unit's strategy. This should help him or her appreciate the importance of the unique measures in evaluating the success of the strategy's implementation. Thus, in the BSC situation, the evaluator's knowledge may counteract the tendency to focus on common measures.

In sum, although a classic judgment and decision-making study showed that common items dominated unique items in a grade prediction task, it is unclear whether the same effect will arise in BSC evaluations. While we believe that strategically adaptive decision making is often automatic and unconscious and that judgments are inherently comparative (Hsee 1996, 1998), the weighting of common and unique measures used on balanced scorecards is an untested empirical issue. We therefore posit the following hypothesis stated in null form.

> H_N: Performance evaluations using the balanced scorecard will be affected by *both* unique measures and common measures.

The next section describes the experimental test of the hypothesis.

IV. METHOD

Overview of Experiment

Participants in the experiment read a case asking them to take the role of a senior executive of WCS Incorporated, a firm specializing in women's apparel.[3] The case materials focus on WCS's two largest divisions. The case indicates that the firm's chief financial officer attended a Harvard Business School symposium on the balanced scorecard. Further, it describes the BSC concept and lists the four categories of measures. Participants learned that WCS decided to implement the BSC. The case quotes WCS's mission statement,[4] introduces the managers of the two business units (divisions), describes the strategies of the divisions, and presents a balanced scorecard for each division. Table 1 presents one division's balanced scorecard. Participants acted as a WCS senior executive (superior), making the following judgment for each (subordinate) unit's manager.[5]

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[3] The authors (one of whom has prior experience with apparel retailing) developed the case following Kaplan and Norton's (1996b) Kenyon Stores example.

[4] The mission statement says, "We will be an outstanding apparel supplier in each of the specialty niches served by WCS."

[5] The following qualitative descriptors were listed below the scale:
Excellent: far beyond expectations, manager excels
Very good: considerably above expectations
Good: somewhat above expectations
Average: meets expectations
Poor: somewhat below expectations, needs some improvement
Very poor: considerably below expectations, needs considerable improvement
Reassign: sufficient improvement unlikely

TABLE 1
The Balanced Scorecard for RadWear Division Employed in the Experiment[a]

Measure	*Target*	*Actual*	*Percent Better than Target*
Financial:			
1. Return on sales	24%	26%	8.33
2. New store sales	30%	32.5%	8.33
3. Sales growth	35%	38%	8.57
4. Market share relative to retail space	$80	$86.85	8.56
Customer-Related:			
1. Mystery shopper program rating	85	96	12.94
2. Repeat sales	30%	34%	13.33
3. Returns by customers as percentage of sales	12%	11.6%	3.33
4. Customer satisfaction rating	92%	95%	3.26
Internal Business Processes:			
1. Returns to suppliers	6%	5%	16.67
3. Average major brand names/store	32	37	15.63
3. Average markdowns	16%	13.5%	15.63
4. Sales from new market leaders	25%	29%	16.00
Learning and Growth:			
1. Average tenure of sales personnel	1.4	1.6	14.29
2. Hours of employee training/employee	15	17	13.33
3. Stores computerizing	85%	90%	5.88
4. Employee suggestions/employee	3.3	3.5	6.06

---

[a] A similar scorecard was prepared for WorkWear, the other division in the experiment.

Indicate your initial performance evaluation for this manager by placing an 'X' somewhere on the scale below.

0 50 100

|---|---|---|---|---|---|---|---|---|---|

Reassign Very Poor Poor Average Good Very Good Excellent

This task follows Kaplan and Norton (1996b, 1996a) in that each unit develops its own scorecard and a superior manager evaluates the unit relative to this scorecard.

After evaluating the unit managers, participants completed a debriefing questionnaire. This asked for demographic information, provided manipulation checks (discussed further in the results below), and gathered data regarding task difficulty, realism, and understandability.

The two divisions described are RadWear, a retail division specializing in clothing for the urban teenager, and WorkWear, a division that sells business uniforms through direct sales contacts with business clients. The case describes the strategies of the two divisions as follows.

> RadWear's management determined that its growth must take place through an aggressive strategy of opening new stores. RadWear also determined that it must

> increase the number of brands offered to keep the attention and capture the clothing dollars of its teenage customers. RadWear concluded that its competition radius is fairly small due to the low mobility of young teens.
>
> Although WCS has historically focused on women's clothing, WorkWear's management decided to grow its sales by including a few basic uniforms for men. It is expected that this will make WorkWear a more attractive supplier for businesses that want to purchase uniforms from a single supplier. WorkWear also decided to print a catalog so that clients could place some orders without a direct sales visit, particularly for repeat or replacement orders; this should help to retain some sales which might otherwise be lost due to time considerations.

The performance measures for each division are appropriate for that division and capture these strategies.

Subjects

Fifty-eight first year M.B.A. students served as experimental participants. The students had, on average, more than five years of work experience and 63 percent were male.

Design and Procedure

The experiment employs a 2 × 2 between subjects (Ss) design, in conjunction with a 2-level within-Ss factor (i.e., the complete design is 2 × 2 × 2). The first independent factor indicates the particular pattern of performance for the two business units based on their common measures. Thus, RadWear could perform better on the common measures than WorkWear (COM-Rad) or WorkWear could outperform RadWear on the common measures (COM-Work). Similarly, the second factor is the particular pattern of performance for RadWear and WorkWear based on their unique measures. So RadWear could perform better on its unique measures than does WorkWear on its unique factors (UNIQ-Rad) or vice versa (UNIQ-Work). Each subject evaluated both divisional managers, thus division (RadWear, WorkWear) is the within-Ss factor.

We developed separate 16-measure balanced scorecards for WCS's two divisions. The scorecards contained four performance measures in each of the BSC categories. Each category included two common measures (i.e., used for both divisions) and two unique measures (i.e., designed only for RadWear or only for WorkWear). Table 2 lists the performance measures. For all measures, each division performed better than its target. The percentage above target, however, varied in the design as indicated above.

We chose all performance data so that common and unique items had the same excess performance. For example, in COM-Rad the first common financial measure (i.e., Return on Sales) was 8.33 percent above target for RadWear and 4.17 percent above target for WorkWear. Similarly, in UNIQ-Rad, the first unique financial measure was 8.33 percent above target for RadWear and 4.25 percent above target for WorkWear. Although the exact percentages varied slightly due to rounding, we counterbalanced and controlled even these small variations. The sum of excess performance (percentage above target) for common measures was 85.18 for the better division and 51.99 for the worse division (a difference of 33.19). The sum of excess performance for unique measures ranged from 84.96 to 85.08 for the better division and 51.20 to 51.95 for the worse division (a difference of 33.01 or 33.88). The slight variation for the unique measures was due to the different units or bases for the measures related to RadWear vs. WorkWear. (This strict control over performance levels eliminates the potential confound present in Slovic and MacPhillamy [1974], as

TABLE 2
Common and Unique Performance Measures for RadWear and WorkWear Divisions' Balanced Scorecards

Type[a]	*Measure*
Financial Measures:	
C	Return on sales
C	Sales growth
U-Rad	New store sales
U-Rad	Market share relative to retail space
U-Work	Revenues per sales visit
U-Work	Catalog profits
Customer-Related Measures:	
C	Repeat sales
C	Customer satisfaction rating
U-Rad	Mystery shopper program rating
U-Rad	Returns by customers as a percent of sales
U-Work	Captured customers
U-Work	Referrals
Internal Business Process Measures:	
C	Returns to suppliers
C	Average markdowns
U-Rad	Average major brand names per store
U-Rad	Sales from new market leaders
U-Work	Orders filled within one week
U-Work	Catalog orders filled with errors
Learning and Growth Measures:	
C	Hours of employee training per employee
C	Employee suggestions per employee
U-Rad	Average tenure of sales personnel
U-Rad	Stores computerizing
U-Work	Percent sales managers with M.B.A. degrees
U-Work	Database certification of clerks

[a] C indicates a common measure. U-Rad is a unique measure for RadWear, a teen-wear retail division. U-Work is a unique measure for WorkWear, a uniform division that sells through catalogs and sales calls. Participants received a brief written description of the calculation of each measure.

discussed previously). Table 1 shows that the percent "better than target," calculated to the second digit, appears as a column in the scorecards presented to the participants.

Pilot Testing the Instrument

The experiment is designed to compare how subjects respond to common vs. unique measures, so participants must believe these two sets of measures have similar validity. Unfortunately, we could not use a specific item (e.g., catalog profits) as a common measure for some subjects and a unique measure for others. This is not possible because measures for each division must link to that division's strategy (and catalog profits would be inappropriate for RadWear, for example). Instead, we performed several tests to determine whether participants perceived the two sets of measures similarly.

First, we tested whether the groups of unique measures chosen for RadWear and WorkWear were similar in their relation to the BSC categories. A group of 14 M.B.A. students (who did not participate in the experiment) rated how typical each measure was of its category. The rating scale ranged from 0 "not at all typical" to 10 "very typical." The average rating was 7.13 and the typicality of RadWear's unique measures did not differ from WorkWear's unique measures (means of 7.00 and 7.25, respectively; $t = 0.64$, $p > 0.5$). This indicates that the unique measures we chose for the two divisions were similarly representative of their BSC categories. Thus, subjects should not differ in their use of unique measures simply due to a misunderstanding regarding these measures for one division.

Second and more important, we tested whether common and unique measures were equally relevant to the performance evaluation judgments we asked the subjects to make. We listed the 16 measures for each division and asked 18 masters of accounting students (who did not participate in the experiment) to rate each of these measures as to "its relevance for evaluating the performance of the division manager," using a scale from 1 "low relevance" to 10 "high relevance." There were no differences between common and unique measures' decision relevance in total (average relevance scores of 7.17 and 7.02, respectively, $t = 0.84$) or for RadWear (7.07 vs. 7.28, $t = 1.44$) or WorkWear (7.29 vs. 7.28, $t = 0.08$) individually. Thus, any difference in subjects' use of common and unique measures is not likely attributable to differences in perceived relevance of these measures.

Finally, to broaden our checks beyond our pre-test subjects we examined a study by Dempsey et al. (1997). Dempsey et al. (1997) asked financial analysts to rate a set of strategic measures as to their frequency of use and predictive value for the analysts; ten of our measures (five common and five unique) appeared in their list. Using Dempsey et al.'s (1997) data, there were no significant differences between our common and unique measures in either analysts' frequency of use ratings (means on a scale of 1 to 5 of 2.64 and 2.63, respectively, $t = 0.02$) or predictive values (2.83 and 2.80, respectively, $t = 0.12$).

In summary, our pilot tests indicate that our unique measures for the two divisions are similarly representative of their BSC categories. The tests also indicate that although we could not use exactly the same items as both common and unique measures, our common and unique measures are similarly relevant to divisional performance judgments and similarly important to financial analysts in evaluating firms. Further, as noted above, we carefully controlled the particular "percent above target" values for the common and unique measures so that differences in performance would not confound our results.

Dependent Measure

All subjects evaluated the manager of RadWear as well as the manager of WorkWear. We want to determine whether performance on common and unique measures affects subjects' evaluations of the division managers. If common measures affect these evaluations, we will observe an interaction of division and common measures. If unique measures affect these evaluations, we will find an interaction of division and unique measures.

V. RESULTS

A manipulation check shows the participants recognize that the two divisions employ different performance measures ($p < 0.01$). Further manipulation checks show that participants agree the two divisions sell to different markets ($p < 0.01$) and that it is appropriate for the divisions to employ different performance measures ($p < 0.01$). In addition, there are no differences across experimental treatments in ease of understanding, case difficulty, or case realism (all p-values > 0.10). The manipulation check results do not vary across experimental treatments.

We used a 2 × 2 × 2 repeated-measures ANOVA to test our hypothesis. The results appear in Panel A of Table 3. The only statistically significant effect is the interaction of common measures and division ($F = 30.69$, $df = 1,54$, $p < 0.01$) indicating that the pattern of performance on common measures affects the managers' evaluations, while the pattern for unique measures does not.[6] Panel B of Table 3 indicates that when common measures favor RadWear, the superior manager evaluates RadWear's manager 5.97 points higher than WorkWear's manager. Similarly, when common measures favor WorkWear, WorkWear's manager is evaluated 7.17 points higher than RadWear's manager. In contrast, when unique measures favor RadWear (WorkWear), there is no significant difference in the evaluations of the managers, a mean difference of 0.64 (1.77). We also used regression analysis, regressing the differences in managerial performance evaluations (RadWear's evaluation minus WorkWear's evaluation) on the relative performance on common measures (coded "1" when RadWear outperformed WorkWear and "0" otherwise) and the relative performance on unique measures (analogously coded). The common measures have a significantly positive slope coefficient of 10.87 ($t = 3.28$, $p < 0.01$) while unique items' coefficient of 0.08 is insignificant ($t = 0.02$, $p > 0.10$).[7] Thus, the results suggest that Slovic and MacPhillamy's (1974) finding of a natural simplifying strategy whereby common measures dominate unique measures also applies in a BSC context.

VI. IMPLICATIONS, LIMITATIONS, AND RESEARCH ISSUES

This study shows that unique measures in a business unit's BSC may be underweighted in performance evaluation. This section describes implications of this result, acknowledges some limitations of the study, and discusses special research challenges arising in studies of real-world accounting and management phenomena.

Implications of the Results

Our evidence concerning the disregard or underuse of unique measures in evaluating business unit performance has two major implications. First, our evidence that unique measures are disregarded in the *ex post* performance evaluation of a business unit's manager has significant implications for the unit manager's *ex ante* decision-making strategy. Holmstrom and Milgrom (1991) show analytically that agents' decisions are affected by items that are included in their performance evaluation and compensation. They also show that items not included in evaluation and compensation of an agent will have little effect on the agent's decisions. Psychological research (e.g., McNamara and Fisch 1964) has shown this same result experimentally. Thus, our results suggest that common measures that drive the unit managers' evaluations will have more effect on unit managers' decisions than will the unique measures that are not used in the evaluations.[8]

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[6] Tests of ANOVA model assumptions indicate no problems except for nonnormality of the error terms. This is not unusual for a study including repeated measures. Although the F-tests are quite robust to this nonnormality, we also ran an additional ANOVA using the difference between the performance evaluations of the managers of the two divisions as the dependent variable (RadWear's evaluation minus WorkWear's evaluation). This analysis meets all ANOVA assumptions and the results corroborate the reported results (i.e., only common measures have a significant effect on the difference in the managers' evaluations, $F = 30.69$, $p < 0.01$).

[7] We also included the interaction of the common and unique measures; the effect was statistically insignificant ($t = 0.99$, $p > 0.3$). The regression's adjusted R^2 is 0.34.

[8] Davila and Simons' (1997) case study on performance evaluation at Citibank indicates senior management's concern regarding the effect of performance evaluation on future unit decision making. In this case, the unit manager performed poorly in one BSC category. The senior manager worries that "[i]f the performance evaluation team gave [the evaluatee] an "above par" [rating] people could think the division was not serious about its nonfinancial measures" (Davila and Simon 1997, 4).

TABLE 3
Experimental Results for Managers' Performance Evaluations

Panel A: Results of a 2 × 2 × 2 Repeated Measures ANOVA of Evaluations of the Performance of RadWear and WorkWear Divisions' Managers

Variable	*df*	*SS*	*MS*	*F*	*p*
Between Subjects:					
Common	1	143.86	143.86	0.54	0.47
Unique	1	57.16	57.16	0.21	0.65
Common × Unique	1	434.13	434.13	1.63	0.21
Error	54	14,402.36	266.71		
Within Subjects:					
Division	1	9.15	9.15	0.22	0.64
Division × Common	1	1,265.38	1,265.38	30.69	0.00
Division × Unique	1	42.04	42.04	1.02	0.32
Division × Common × Unique	1	40.07	40.07	0.97	0.33
Error	54	2,226.44	41.23		

Panel B: Evaluations of the Performance of RadWear and WorkWear Divisions' Managers[a]

Measures		*Favor RadWear*	*Favor WorkWear*
Common	RadWear	74.21[b]	70.00
		(11.08)	(12.86)
	WorkWear	68.24	77.17
		(14.26)	(11.09)
Difference: RadWear − WorkWear		5.97	−7.17
Unique	RadWear	72.00	72.20
		(11.02)	(13.19)
	WorkWear	71.36	73.97
		(11.70)	(14.97)
Difference: RadWear − WorkWear		0.64	−1.77

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[a] Evaluations made on a 101-point scale, with 0 labeled "Reassign" and 100 labeled "Excellent."

[b] Panel values are mean (standard deviation). *Common* measures appear on both divisions' balanced scorecards, *Unique* measures appear on only one division's balanced scorecard. *Favor Radwear* indicates the measures were higher for the RadWear division than the WorkWear division. *Favor WorkWear* indicates the measures were higher for the WorkWear division than the RadWear Division.

Second, Kaplan and Norton (1996b) note that lagging measures are often rather generic (i.e., applicable to many units), while leading measures are more likely to be customized for each business unit. Thus, evaluators who focus on common measures may largely overlook or disregard leading measures. Further, since financial measures are often common across business units, the unique nonfinancial measures may receive less attention. Underweighting nonfinancial and leading measures undermines the goals of the BSC, which was expressly designed to incorporate such measures into managerial thought and decision making (Kaplan and Norton 1996a, 1996b).

Limitations of the Study

Our experimental design has limitations. First, our experimental participants were not involved in development of the units' scorecards. Thus, we are unable to investigate the effect of such involvement, although greater involvement might increase reliance on all the BSC measures, including the unique measures. However, our experiment captures the hierarchical nature of business organizations where higher-level managers evaluate lower-level unit managers, and these higher-level managers are not directly involved in unit BSC development. A second limitation is that our participants may have been novices in the use of the BSC, and they did not necessarily have business experience in the retail and apparel sector from which we developed our case materials. Third, although our experiment carefully controlled performance on common and unique measures, it is possible that the perceived performance relative to the targets differed for the various groups of measures. While our pilot tests and manipulation checks did not reveal any such problems, this possibility cannot be ruled out.

Research Obstacles

Recent and widespread interest in the BSC motivated this study. Our knowledge of the judgment and decision-making literature led us to believe that use of this tool might be impaired by managers' cognitive limitations, and that these limitations would lead to predictable judgment effects. However, this study was primarily motivated by a desire to better understand a real-world phenomenon. We offer some observations regarding special difficulties in conducting research motivated by such phenomena.

Ideally, empirical accounting research should be conducted in the context of relevant theories and models. This can be particularly difficult for studies focusing on topical accounting and management issues. Analytical models and general theories require simplifying assumptions to maintain tractability. The realism of these assumptions determines whether the models and their predictions can be applied directly to the phenomenon of interest. Even when these models cannot be applied directly, researchers can still use the models to (1) suggest variables to investigate through manipulation or direct measurement, (2) sensitize the researcher to variables that should be covariates or controls, and (3) indicate particularly problematic variables that the researcher cannot control but must consider in drawing conclusions from the study. For example, Banker and Datar's (1989) model indicates the importance of controlling the decision relevance of common and unique measures in our task. This insight prompted us to use pilot tests to ensure that participants perceived common and unique measures as equally decision-relevant.

The inability to directly apply analytical models to many real-world situations means that a normative criterion against which to evaluate judgments and decisions will often be absent. For example, there is no normative model for performance evaluation scores, so we cannot assess the accuracy of our participants' evaluations in this study. Although the frequent absence of a normative criterion can be a disadvantage relative to studies that are motivated by, and designed around, a test of a normative theory, researchers can deal with this challenge in at least two ways. In our case, we designed our study to test for *differences* in judgment across levels of common and unique measures. Knowing the correct evaluation scores is not necessary to test and show that common measures have more judgmental impact than unique measures, contrary to the spirit of the BSC. Illustrating another approach, Cloyd and Spilker (1999) and Libby and Libby (1989) use panels of experts to determine judgment criterion for realistic tax and audit tasks, respectively. Thus, the lack of a normative model need not preclude investigation of a research question, although it presents challenges to the researcher.

Determining the scope of a study motivated by a real-world phenomenon is also challenging. In research designed to test a specific theory, the scope of the study is determined by that theory. The number of factors, the number of tests, issues that are central and those peripheral to the study are all determined by the theory. In contrast, the scope of a study motivated by a real-world phenomenon is less determinate; it is often unclear how many factors must be included or which factors are most important for study. Although models and theories suggest potentially important factors, the choice of models and, consequently, variables is a matter of researcher knowledge and interest. For example, we base our study on prior psychological work on the use of common and unique information items. Future BSC research may investigate other attributes, such as precision or sensitivity of the measures (Banker and Datar 1989), or could explore processing issues such as information overload (Schick et al. 1990) or information organization effects. However, it remains unclear how many such issues a single study could feasibly address.

Investigating a real-world phenomenon leads to a natural desire to report how firms are actually doing business and how many firms are using the methods of interest. Such data can be very difficult to obtain, particularly as firms make the transition to the new methods or, as in the case of the BSC, when firms consider the information proprietary and sensitive (Kaplan and Norton 1996b, 148). We would like to report how many firms use the BSC and we would like to provide data regarding the prevalence and types of common and unique measures, but such information is not readily available.

Absent relevant archival data, researchers may use experimental tests to study real-world phenomena. However, it can be difficult to identify appropriate participants for the experiments. We chose to use graduate business students who were novices in the use of the BSC. Other potential subject groups include employees of a particular BSC firm, employees in a cross-section of BSC firms, or people who have been trained in the use of a BSC. These different subject pools have different advantages and disadvantages, and theory does not suggest an optimal choice. In a study of the use of common vs. unique measures, focusing on employees of a particular BSC firm as they use their own actual scorecards would compromise experimental control. Specifically, performance on common measures would need to differ substantially from performance on unique measures in order to determine the effects of the two types of measures. Using employees from a cross-section of BSC firms means that most or all participants would be presented with scorecards different from those used in their own firms and units. In this case, participants' own experiences with specific measures may differ from the situation presented in the experimental materials (e.g., catalog profits is a unique measure in our experiment, but it could be a common measure in some firms). This might lead a participant to weight a measure based on his or her experience with the measure (e.g., high weight for a measure that is common in the participant's firm) rather than responding to the manipulated level of the measure (e.g., unique in the experimental instrument) so that test results may not capture the effects of manipulated variables. Finally, training experimental participants to use a scorecard can lead to significant demand effects. For example, if we trained our student-subjects to weight BSC items in a particular way or to use a particular strategy for interpreting the scorecards (e.g., using a causal diagram linking the measures to one another), our tests of the use of measures would largely reflect the success of our training program. Thus, although it is tempting to use subjects with BSC experience, this presents difficulties for a controlled and generalizable study.

Conclusion

Interest in the balanced scorecard continues to grow. However, proponents, adopters, and researchers know very little about the human information processing demands of the

BSC. Judgment and decision-making research indicates that humans use simplifying decision strategies that are affected by task characteristics. We investigated the effect on performance judgments of the BSC's inclusion of diverse measures. Our experimental participants succumbed to the simplifying strategy of using only common measures in evaluating multiple managers.[9] If unique measures are underweighted in *ex post* evaluations of the business unit and its manager, these measures are likely to receive little *ex ante* weight in the unit's decisions (Holmstrom and Milgrom 1991). This focus on common measures undermines one of the major espoused benefits of the BSC, namely, that each business unit will have and use a scorecard that uniquely captures its business strategy.

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[9] Interestingly, accounting practitioner journals and management journals recommend remedies for assimilating common and unique performance measures. Lee (1992) and Nourayi and Daroca (1996) both recommend that evaluators convert unique measures into common measurement scales via indices. While such aggregation can alleviate cognitive difficulties of working with unique measures, it sacrifices the BSC characteristic of using specific individual measures clearly tied to the business unit's strategic goals.

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The Effect of Incentive Contracts on Learning and Performance

Geoffrey B. Sprinkle
Indiana University

ABSTRACT: This paper reports the results of an experiment that examines how incentive-based compensation contracts compare to flat-wage compensation contracts in motivating individual learning and performance. I use a multiperiod cognitive task where the accounting system generates information (feedback) that has both a contracting role and a belief-revision role. The results suggest that incentives enhance performance and the rate of improvement in performance by increasing both: (1) the amount of time participants devoted to the task, and (2) participants' analysis and use of information. Further, I find evidence that incentives improve performance only after considerable feedback and experience, which may help explain why many prior one-shot decision-making experiments show no incentive effects. Collectively, the results suggest that incentives induce individuals to work longer and smarter, thereby increasing the likelihood that they will develop and use the innovative strategies frequently required to perform well in complex judgment tasks and learning situations.

Key Words: *Incentives, Learning, Effort and performance, Cognitive task.*

Data Availability: *Data gathered in this study are available from the author upon request.*

I. INTRODUCTION

This study investigates how incentive-based compensation contracts compare to flat-wage compensation contracts in motivating individual learning and performance. I investigate learning in the context of a multiperiod production setting where the

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accounting system generates information that has both a contracting role and a belief-revision role. My primary objective is to examine whether and how incentive-based contracts improve individuals' performance in situations where they can learn from feedback and experience.

Many managerial decisions are multiperiod and dynamic in nature. For example, decisions concerning all aspects of production are typically repeated as firms attempt to maximize profits in the face of changing conditions. Repeated decisions provide an opportunity for learning, and evidence suggests that organizational performance increases when individuals learn to use firm assets effectively and efficiently (Hayes et al. 1988; Horngren et al. 2000).

A fundamental objective of managerial accounting systems is to facilitate learning and performance (Atkinson et al. 1997, 4). Specifically, managerial accounting information has two major potential uses in multiperiod settings. First, managerial accounting information enables individuals to revise their beliefs, and thus to improve firm productivity by making better-informed decisions. Second, managerial accounting information can be used in compensation contracts to motivate individuals to improve firm productivity. Economic (agency) theory suggests that these two uses of managerial accounting information are not independent. For learning to occur, theory suggests that (1) individuals must be able to use the information (feedback) provided for belief-revision purposes to improve future productivity, *and* (2) the firm must use incentive contracts to motivate individuals to exert effort and use feedback to improve performance.

Relatively few studies (Arkes et al. 1986; Ashton 1990; Hogarth et al. 1991) have examined the extent to which monetary incentives motivate effort and performance in multiperiod cognitive tasks that allow learning from feedback. In contrast to economic theory, the results of these studies indicate that performance-based contracts do not improve, and sometimes even degrade, learning and performance (at least relative to flat-wage contracts).[1] These findings suggest that incentives may divert a decision maker's attention away from how best to do the task, and to instead focus on how well he is doing on the task (Humphreys and Revelle 1984; Ashton 1990; Wood et al. 1990; Hogarth et al. 1991). In essence, incentives may create a dysfunctional preoccupation with extrinsic rewards that discourage risk-taking, creativity, and innovation (Kohn 1993). If this is the case, then in learning situations the firm need only provide managers with information for belief-revision purposes; there may be no further gains from using information for contracting (i.e., motivational) purposes.

However, this prior experimental research has not considered settings where the incentive contract is optimal and/or there is a significant role for learning. As a result, it is unclear whether the results generalize to environments where *both*: (1) the information provided for belief-revision purposes helps individuals improve productivity, *and* (2) the incentive contract motivates individuals to maximize total expected profit.

The current study examines how incentive-based compensation contracts, compared to flat-wage compensation contracts, affect individual learning and performance in an experiment that has a unique and optimal decision rule. Learning plays a significant role in the experiment, and the incentive-based contract theoretically motivates participants to (1) exert first-best effort, and (2) use feedback to make choices that maximize total expected profit. The results indicate that participants receiving the incentive-based contract spend more time on the task than participants receiving the flat-wage contract, and that this effort difference remains constant over the course of the experiment. Participants receiving the incentive-based contract also perform better on the task than participants receiving the flat-wage contract. However, there are no statistically significant differences in performance between compensation conditions for the first 15 of the 60 experimental periods. Moreover, the dynamics indicate that the positive difference in performance between compensation conditions increases significantly over the course of the experiment. Finally, incentives significantly enhance performance even after controlling for differences in the amount of time participants spend on the task.

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[1] More generally, recent reviews of judgment and decision-making studies show that incentives frequently do not improve performance (e.g., Jenkins et al. 1998; Bonner, Hastie, Sprinkle, and Young 1999; Bonner and Sprinkle 1999; Camerer and Hogarth 1999).

These results have several important implications. First, the results suggest that incentives can increase the rate of improvement in performance and accelerate the learning curve. This finding is of particular interest given firms' recent emphasis on continuous improvement and enhancing productivity. Second, the results indicate that incentives improve performance by motivating individuals to increase both the duration and intensity of their effort. Thus, incentives not only motivate individuals to work longer on a task, but the evidence also suggests that incentives enhance the quality of attention individuals devote to the task. This in turn enables individuals to develop better strategies that help them make decisions more consistent with profit maximization.

Third, the results suggest that the quality of the information provided for belief-revision purposes and the form of the incentive contract may help explain why prior multiperiod decision-making experiments do not detect any incentive effects. The results also suggest that many one-shot individual choice and decision-making experiments may fail to detect incentive effects because participants lack feedback and experience with the task.

In sum, my findings suggest that the belief revision and contracting uses of managerial accounting information are not independent. Belief-revision feedback information enabled participants to learn (improve performance), but the magnitude of this learning increased when the information provided by the accounting system was also used for contracting purposes.

The rest of this paper is organized into four sections. The next section develops the hypotheses, and Section III presents the experimental design. Section IV reports the results of the analyses. The results are summarized and discussed in Section V.

II. BACKGROUND AND HYPOTHESES

Prior experimental research has investigated whether incentives motivate individuals to improve their performance in multiperiod tasks that encompass learning from feedback. This research has found that, relative to flat-wage contracts, incentive contracts do not improve, and sometimes even degrade, learning and performance (Arkes et al. 1986; Ashton 1990; Hogarth et al. 1991). In a probabilistic task, Arkes et al. (1986) found that participants in an incentive condition made fewer accurate judgments than participants in a no-money condition. In a multiple-cue probability learning experiment, Ashton (1990) found that professional auditors' bond-rating performance in an incentive plus feedback condition was not significantly better than performance in a condition with feedback alone. In a single-cue probability learning study, Hogarth et al. (1991) manipulated both exactingness (the steepness of the loss function) and incentives. They found no significant main effects for incentives and only one significant exactingness-by-incentives disordinal interaction. These findings, as well as many other experiments that show no incentive effects (see, e.g., Bonner, Hastie, Sprinkle, and Young 1999), led some to suggest that financial incentives have little effect on the results of decision-making experiments (Thaler 1986; Tversky and Kahneman 1986; Dawes 1988; Libby and Lipe 1992).

There are a number of explanations for the lack of incentive effects on multiperiod tasks that involve learning from feedback (and, more generally, decision-making experiments that find no incentive effects). First, in complex cognitive and learning tasks, incentives may divert a decision maker's attention away from how best to do the task, and to instead worry about how well he is doing on the task (Baumeister 1984; Humphreys and Revelle 1984; Kanfer and Ackerman 1989; Ashton 1990; Wood et al. 1990; Hogarth et al. 1991; Kohn 1993). Second, extrinsic rewards may undermine an individual's intrinsic motivation to perform a task (Weiner 1980; Deci and Ryan 1985; Kohn 1993; Vogl 1994). Prior research posits that intrinsic motivation promotes more creative and flexible decision making than extrinsic motivation (Deci and Ryan 1985; Skaggs et al. 1992). Thus, extrinsic incentives may actually impair performance on the very tasks they were intended to motivate (Freedman et al. 1992). Finally, if individuals are motivated to work hard even when they expect no personal reward (Simon 1991), compensation's conventional role of motivation may be less important than its role in informing individuals of their responsibilities (White 1985).

There are, however, alternative explanations for prior research's general failure to detect incentive effects. Prior research has not satisfied many of the incentive or informational conditions that theory suggests are important for incentive contracts to enhance effort and performance in multiperiod settings. First, the incentive contracts chosen by Arkes et al. (1986), Ashton (1990), and Hogarth et al. (1991) have rather weak incentive properties. For example, Arkes et al. (1986) and Ashton (1990) used tournament incentive schemes, and Hogarth et al. (1991) used a discontinuous incentive scheme. These contracts can induce inconsistent, high-variance strategies and outcomes (Friedman and Sunder 1994). Second, in all three studies the value of feedback provided to participants was unclear. For example, in Arkes et al. (1986), feedback contained no additional information beyond the priors initially given to participants; in Ashton's (1990) study, feedback did not foster learning as auditors' later judgments were not more accurate than their earlier ones (Heiman 1990); in Hogarth et al. (1991), participants were not aware of how decisions and outcomes translated into earnings. Thus, the relatively weak forms of the incentive contracts and the relatively poor quality of the feedback may account for the failure to detect performance-enhancing incentive effects.

To determine whether the results of prior research might be attributable to economic factors, the current study examines the effects of incentive-based and flat-wage compensation contracts on individual learning and performance in an experiment where: (1) the information provided for belief-revision purposes can help participants improve future average productivity, and (2) the form of the incentive contract should motivate individuals to choose the effort levels and make decisions that maximize total expected profit. In my experimental setting, participants must (implicitly) solve a dynamic programming problem. The feedback provided for belief-revision purposes allows participants to make better-informed action choices. In addition, the incentive-based contract theoretically motivates participants to implement the first-best strategy over action choices, and to use feedback to maximize total expected performance. This leads to the first two hypotheses (stated in alternative form):

H1: Compared to individuals receiving a flat-wage contract, individuals receiving an incentive-based contract will exert more effort on the task.

H2: Compared to individuals receiving a flat-wage contract, individuals receiving an incentive-based contract will perform better on the task.

Hypotheses 1 and 2 are stated in terms of an overall average effect. As explained next, I also expect the performance superiority induced by the incentive condition to increase over the course of the experiment.

As noted previously, many "one-shot" (single-period) individual choice and decision-making experiments find no incentive effects.[2] One explanation for their failure to detect incentive effects is that when individuals first perform a task, they may not understand how to perform it well (Awasthi and Pratt 1990; Libby and Lipe 1992; Bonner, Hastie, Young, Hesford, and Gigone 1999). In this case, individuals receiving incentive contracts may in fact exert more effort on the task (Awasthi and Pratt 1990). However, if initial performance on the task is not effort-sensitive (e.g., because individuals lack the statistical intuition or an understanding of the task requirements), it is unlikely that the study will detect an incentive effect (Awasthi and Pratt 1990; Libby and Lipe 1992).

Feedback and experience can help individuals learn and thereby improve their performance, suggesting that performance on a cognitive task is likely to become more effort-sensitive over time. For example, feedback and experience can help individuals eliminate many reasoning errors, and evidence indicates that as individuals repeat decisions, their behavior frequently becomes more consistent with economic predictions (Slonim 1994; Camerer 1995; Roth and Erev 1995). More generally, Horngren et al. (2000, 344) and Hilton et al. (2000, 493) explain that individuals' efficiency and effectiveness generally improve as they become more familiar with a task.

Prior research therefore suggests that performance in the early periods of a cognitive task may not differ between compensation conditions. However, as participants receive feedback and gain experience, the difference in performance will likely increase if participants receiving the incentive-based contract continually exert more effort than participants receiving the flat-wage contract. Moreover, I expect incentives to not only increase the amount of time individuals spend on the task, but also to increase the intensity of effort and thus the quality of attention they devote to the task (Bonner and Sprinkle 1999). In turn, individuals who continually analyze their feedback and refine their strategies are likely to perform better over time (Locke and Latham 1990). This leads to the third hypothesis (stated in alternative form):

H3: The performance superiority induced by the incentive-based contract will increase over the course of the experiment.

III. EXPERIMENTAL DESIGN

Task Description

In the experiment, participants made a production (output quantity) decision for a single product in each of 60 periods. The 60 decision-making periods were partitioned into 12 independent "trials" where each trial consisted of five consecutive periods. In each period (t) of the experiment, the participant's output decision (a_t), combined with a state of nature (s), jointly determined profit (π_t), $\pi_t = f(a_t, s)$. Table 1 lists the possible output choices (quantities), states of nature, and profit for each possible output choice and state of nature combination for each period of the experiment.

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[2] One-shot individual choice and decision-making experiments that find no incentive effects include or are discussed in Fischhoff et al. (1977), Enzle and Ross (1978), Grether and Plott (1979), Grether (1980), Thaler (1986), Tversky and Kahneman (1986), Dawes (1988), Wright and Anderson (1989), Awasthi and Pratt (1990), Gigerenzer et al. (1991), Henry and Sniezek (1993), Salvemini et al. (1993), Wright et al. (1993), Henry (1994), Pelham and Neter (1995), Byram (1997), Bonner, Hastie, Sprinkle, and Young (1999), and Camerer and Hogarth (1999).

TABLE 1
Profit (in Points) from Each Possible Output Quantity and State of Nature Combination for Each Period of the Experiment[a]

State of Nature (s)	*Output Quantity (a)*																			
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*
1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	5	5	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	5	5	10	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5	5	10	20	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	5	5	10	20	20	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	5	5	10	20	20	30	30	0	0	0	0	0	0	0	0	0	0	0	0	0
8	5	5	10	20	20	30	30	30	0	0	0	0	0	0	0	0	0	0	0	0
9	5	5	10	20	20	30	30	30	45	0	0	0	0	0	0	0	0	0	0	0
10	5	5	10	20	20	30	30	30	45	45	0	0	0	0	0	0	0	0	0	0
11	5	5	10	20	20	30	30	30	45	45	60	0	0	0	0	0	0	0	0	0
12	5	5	10	20	20	30	30	30	45	45	60	60	0	0	0	0	0	0	0	0
13	5	5	10	20	20	30	30	30	45	45	60	60	60	0	0	0	0	0	0	0
14	5	5	10	20	20	30	30	30	45	45	60	60	60	80	0	0	0	0	0	0
15	5	5	10	20	20	30	30	30	45	45	60	60	60	80	80	0	0	0	0	0
16	5	5	10	20	20	30	30	30	45	45	60	60	60	80	80	95	0	0	0	0
17	5	5	10	20	20	30	30	30	45	45	60	60	60	80	80	95	95	0	0	0
18	5	5	10	20	20	30	30	30	45	45	60	60	60	80	80	95	95	95	0	0
19	5	5	10	20	20	30	30	30	45	45	60	60	60	80	80	95	95	95	100	0
20	5	5	10	20	20	30	30	30	45	45	60	60	60	80	80	95	95	95	100	100

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[a] Participants in the experiment made an output quantity decision in each of 60 periods. The 60 decision-making periods were partitioned into 12 independent trials, where each trial consisted of five periods in which the state of nature did not change from period to period. For any given trial, each of the 20 states of nature occurred with equal probability.

Participants in the experiment received the following information about a_t, s, and $f(a_t, s)$. First, in each period of the experiment participants knew that $a_t \in \{1,2,3,\ldots,18,19,20\}$, $s \in \{1,2,3,\ldots,18,19,20\}$, and $f(a_t, s)$ for all possible output choices and states of nature. Second, participants were informed that s did not change over a five-period interval. That is, for experimental purposes a "trial" consisted of five periods in which the state of nature, s, did not change from period to period. In each trial, participants made five consecutive output choices; one choice for each period. Third, participants knew that at the start of each trial, each of the 20 states of nature occur with equal probability (i.e.,

$s \sim U[1,20]$ discrete). Finally, at the end of each period t, $t \in \{1,2,3,4,5\}$, within each trial, participants knew they could observe feedback regarding the realized profit, $\pi_t,\ldots,\pi_1$, for each output decision that they had made up to and including period t.

The realized profit information, $\pi(\cdot)$, has two potential uses: (1) belief revision, and (2) contracting. For any period t within each trial a participant can condition output choice a_t on the outcomes of all prior output choices, $\pi_t,\ldots,\pi_1$. Thus, within each trial, participants can use the realized outcomes of all prior output decisions to update their beliefs regarding the expected profit of alternative (future) output decisions. In addition, the realized profit can be used in incentive contracting since $\pi(\cdot)$ is informative about the participant's output choices.

This experiment incorporates two forms of learning. First, participants can learn about the state of nature within each of the 12 trials of the experiment.[3] Second, participants can increase their efficiency and effectiveness on the task by learning from experience (or learning-by-doing) across the 12 trials.

First-Best Strategy[4]

A participant's period 1 information set in each of the 12 trials of the experiment can be defined as $\eta_1 = (1,21)$ since $s \sim U[1,20]$. Therefore, the probability that a participant's first period output choice, a_1, will be less than or equal to s equals $[(21\text{-}a_1)/20]$. Let $\pi^p(a)$ denote the possible positive payoff from the a'th output choice. Then, the participant's one-period maximization problem can be defined as follows:

$$\max_{1 \leq a_1 \leq 20} \quad [\text{prob}(a_1 \leq s|\eta_1) \cdot \pi^p(a_1)]. \tag{1}$$

The value of this one-period maximization problem is 30 points, which corresponds to an output choice of 11. However, this is not the solution to the multiperiod problem participants faced in the experiment; this solution is outlined below.

Table 1 shows that when $a_t \leq s$ the payoff from that output choice is positive (π^p). However, when $a_t > s$ the payoff from that output choice is 0. Thus, depending on π_1, the participant's new information set equals either $\eta_2 = (a_1, 21)$ when $a_1 \leq s$ ($\pi_1 = \pi^p$) or $\eta_2 = (1, a_1)$ when $a_1 > s$ ($\pi_1 = 0$). Therefore, the participant's belief about s at $t = 2$ will be defined by a new uniform distribution over η. Specifically, $s \sim U[a_1,20]$ when π^p results from a_1 or $s \sim U[1, a_1 - 1]$ when 0 results from a_1. As a result, the participant's second period output choice will be $a_2 \in [a_1, 20]$ or $a_2 \in [1, a_1 - 1]$. More generally, for any a_t, the participant's information set can be defined, based on the $t - 1$ previous periods, as $\eta_t = (a_{Ht}, a_{Lt})$ where a_{Ht} is the *highest* output choice with a positive payoff and a_{Lt} is the *lowest* output choice with a 0 payoff. This implies that $a_t \in [a_{Ht}, a_{Lt})$ for all t since the participant knows that s satisfies $a_{Ht} \leq s < a_{Lt}$.

To maximize total expected profit in each trial, a participant must therefore condition period t's output choice on the number of periods remaining $(5 - t + 1)$ and on any information collected about s up to that period (η_t). Accordingly, participants must implicitly solve a finite-horizon dynamic programming problem in each trial. Let $V_t(\eta_t, 5 - t + 1)$ be the value of this dynamic program *before* choice t given the information set η_t and

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[3] The information in Table 1 combined with feedback regarding the realized profit allows participants to increase their expected profit performance in each trial relative to a randomization strategy by approximately 120 points (130 percent).

[4] While the term "first-best" often indicates the absence of informational asymmetries between parties that result in welfare losses, I use the term to refer to the optimal solution of the n-period maximization problem.

5 − t + 1 output choices remaining. Then, for any period t, the participant should choose a_t to:

$$\max_{a_{Ht} \leq a_t < a_{Lt}} \quad [(\text{prob}(a_t \leq s|\eta_t) \cdot \pi^p(a_t)) + E_t(V_{t+1}(\eta_{t+1}, 5 - t))]. \tag{2}$$

I used a computer program to find both the value of this dynamic program and the first-best sequence of output choices. The first-best sequence of output choices and the resulting payoff (profit) appear in Table 2 for all possible state of nature (s) realizations.[5]

Risk Preferences and Effort Measurement

I measure performance as the total profit a participant earned from making output decisions in each trial. Table 1 lists the profit points per output decision. Because profit is stochastically related to output decisions, the setting is multiperiod, and there is a role for learning, I induced risk-neutral preferences to eliminate any consumption smoothing effects and to facilitate the derivation of the first-best decision rule.

I used the Roth and Malouf (1979) and Berg et al. (1986) methods to induce risk-neutral preferences. The points participants earned in each period were converted to a probability of winning the preferred monetary prize in a two-prize lottery. Specifically, for each of the 60 periods of the experiment, I conducted a lottery using tickets numbered sequentially from 1 to 100. If the number of points the participant earned was greater than or equal to the number on the ticket drawn, the participant received $0.50 for that period; otherwise, the participant received $0.00 for that period.

I measure effort as the amount of time a participant spent making output decisions in each trial. Using time as a measure of effort is consistent with the general definition of effort in the agency literature (Baiman 1982) because the participant controls his allocation of time between nontask (leisure) activity and task (work) activity, and the participant derives disutility from time spent on the task. Previous studies have used time to proxy for cognitive effort, and have shown that time is highly correlated with other psychological measures of effort (Bettman et al. 1990).

In addition to the cost in time to develop a strategy, participants also incurred costs in time to implement any strategy that used realized profit information. To see the result of their output choice for each period within a trial (i.e., $\pi_t, \ldots, \pi_1$), participants had to

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[5] In the dynamic (five-period) maximization problem, 14 is the optimal first-period choice. In the one-period maximization problem, 11 is the optimal choice. This difference arises because having choices in later periods can affect choices in earlier periods. Consider the following two-period example, adapted from Amershi et al. (1985). There are three possible states of nature, denoted s_1, s_2, s_3 and three possible actions, denoted a_1, a_2, a_3. States of nature occur with equal probability and the decision maker is risk-neutral. Payoffs for each state of nature and each action follow:

	a_1	a_2	a_3
s_1	3	0	0
s_2	3	60	0
s_3	3	60	105

In a one-period setting choosing a_2 yields an expected profit of 40, whereas choosing a_3 yields an expected profit of 35. However, in a two-period setting choosing a_2 in period 1 yields a two-period expected profit of 2/3[60 + 60] + 1/3[3] = 81, whereas choosing a_3 in period 1 yields a two-period expected profit of 1/3[105 + 105] + 1/3[60] = 90. Thus, the choice problem does not decompose (Amershi et al. 1985), and when learning can occur, choosing the higher action is more informative for subsequent decisions.

TABLE 2
First-Best Sequence of Output Choices and the Resulting Total Profit (in Points) for Each State of Nature[a]

State of Nature (s)	*Output Choices (a_t)*					*Total Profit (in Points)*
	a_1	a_2	a_3	a_4	a_5	
1	14	9	6	4	1	5
2	14	9	6	4	1	5
3	14	9	6	4	1	5
4	14	9	6	4	4	40
5	14	9	6	4	4	40
6	14	9	6	6	6	90
7	14	9	6	6	6	90
8	14	9	6	6	6	90
9	14	9	11	9	9	135
10	14	9	11	9	9	135
11	14	9	11	11	11	225
12	14	9	11	11	11	225
13	14	9	11	11	11	225
14	14	16	14	14	14	320
15	14	16	14	14	14	320
16	14	16	16	16	16	460
17	14	16	16	16	16	460
18	14	16	16	16	16	460
19	14	16	16	16	16	460
20	14	16	16	16	16	460
						Average = 212.50

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[a] To maximize profit in each of the 12 trials of the experiment, participants must (implicitly) solve a five-period dynamic programming problem. In this five-period maximization problem, 14 is the optimal first-period output choice. The optimal second-period output choice is either nine (when realized profit = 0 points) or 16 (when realized profit = 80 points). Similarly, the period 3 output choice will depend on the realized profit observed from period 2, and so on. The total profit (in points) is obtained using the payoff information in Table 1.

request feedback. Upon this request, $\pi_t, \ldots, \pi_1$ was displayed for ten seconds, and participants could not accelerate this process. Thus, the cost to fully implement the first-best strategy ranged from 20 to 40+ seconds because it is necessary to examine feedback at least two times and at most four times (see, e.g., Table 2).

I induced effort aversion by exacting opportunity costs for time spent on the task. Participants had only three minutes to complete each trial. In addition to receiving points for making output choices in each period, participants earned 15 points per minute (five points per 20 seconds, etc.) for finishing each trial before this three-minute time limit.[6] At the end of each trial, these points were converted to a probability of winning an additional $0.50 using the lottery procedures outlined above.

Compensation Contract Manipulation

I manipulated the compensation contract as a between-subjects factor with two levels, incentive-based and flat-wage. Participants in the incentive-based condition received the number of profit points they generated from their output choice in each period. This simple sharing-rule contract provides strong incentives because the participant is both risk-neutral and a residual claimant (Laffont and Tirole 1993).[7] Participants in the flat-wage condition received 40 points each period regardless of the number of profit points generated from their output choice in that period. The 40 points per period approximated the expected number of points participants would earn under the first-best decision rule. As a result, the expected compensation for completing the task was approximately equal between compensation conditions.

The optimal strategy for participants receiving the incentive-based contract is the first-best strategy because the benefits exceed the costs of implementing the first-best strategy for all possible states of nature. That is, the incentive-based contract should motivate participants to implement the first-best strategy (detailed in Table 2) over the five output choices in each trial and, consequently, use feedback to maximize the total expected points in each trial. The optimal strategy for participants receiving the flat-wage contract is not the first-best strategy. Rather, the optimal strategy under the flat-wage contract is a randomization or myopic strategy because the flat-wage contract combined with the opportunity costs provides participants an incentive to shirk (i.e., never request feedback information or use the information provided in Table 1).

Participants and Procedures

Forty undergraduate (sophomore and above) business students from a large midwestern university participated in the experiment. Participants were randomly assigned to one of the two compensation conditions (incentive-based or flat-wage), with an equal number assigned to each condition.

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[6] The specific calculation was: [(180 seconds allowed) – (the participant's time to complete the trial in seconds)] × (0.25 points per second), rounded up to the nearest point. The 15 points per minute was derived as follows. First, I determined that the benefit to requesting feedback was smallest in the choice sequence 14-9-6-4-1 (see Table 2). If profit of "0" occurs after a choice of six, two periods remain under the first-best strategy. The expected benefit of requesting feedback in period 4 is $[(3/5) \times 5] + [(2/5) \times 20] - [(2/5) \times 20] = 3$ points. Since it costs ten seconds to receive this expected three-point benefit, a 15-point-per-minute opportunity cost just makes requesting feedback preferred. Thus, the theoretical solution to the dynamic programming problem is the same with or without the costs of acquiring feedback information. An alternative approach would have been to select a cost large enough so that under some realized states of nature it would not always have been profitable to request feedback. I chose to employ the former approach to ensure that the predicted performance difference between compensation conditions was as large as possible, and also to ensure that exerting effort was costly to participants.

[7] While I have described the task as a single-person setting with an exogenous contract, the problem could be reformulated, without loss of generality, as a standard principal-agent problem (e.g., the hidden information models analyzed by Holmstrom and Milgrom [1987]).

Each session began with the experimenter reading the instructions. The experimenter first informed participants that their task was to earn profit points by choosing a production quantity in each of 60 decision-making periods. Next, the experimenter described the compensation scheme. The instructions indicated that participants receiving the incentive-based contract would earn the number of profit points generated from their output choice, and that participants receiving the flat-wage contract would earn 40 points in each decision-making period. The method for converting these points to cash was then described in detail.

The experimenter explained that the number of profit points earned in a particular decision-making period depended on: (1) the production quantity participants selected, and (2) the state of nature the computer selected. The experimenter also distributed several "profit sheets," each containing the information shown in Table 1. Thus, participants could determine the number of profit points they would earn for each of the 20 output choices (columns), given each of the 20 states of nature (rows) that the computer might choose. Next, the experimenter explained that a trial consisted of five consecutive decision-making periods where the computer selected the same state of nature. Thus, participants knew that the state of nature would remain the same throughout the five periods of each trial.

Participants also learned that during each period within a trial they could see the results of their previous output choices. This feature allowed participants to learn about the state of nature the computer selected for the trial, and thereby allowed participants to update their beliefs regarding the expected profit of alternative future output choices. However, examining feedback was costly. Participants had to request realized profit information, and this feedback information was displayed for ten seconds per request.

After describing the feedback procedures, the experimenter informed participants that they had a maximum of three minutes to complete each trial. In addition, participants were informed that: (1) they would earn 15 points per minute (five points per 20 seconds, etc.) for each minute that they finished before three minutes, and (2) these points were separate from the points they earned from making output choices. To help participants keep track of their time, a computerized clock display counted down from 3:00 minutes to 0:00 minutes.

Participants then learned that the entire experiment consisted of 12 trials (i.e., 12 trials × 5 periods per trial = 60 decision-making periods) and that each trial was separate and independent. Participants were informed that the computer would select 12 states of nature in the experiment, one for each trial, and that these states of nature had been determined in advance. The 12 states of nature were selected in advance to maintain consistency and comparability between sessions and compensation conditions. In addition, to make comparisons between the early (first three) and later (last three) trials of the experiment (e.g., to test H3), the last three states of nature were set the same as the first three states of nature. However, within trials 1–3 and 10–12, the order of these states of nature was randomized.

After listening to the instructions, participants answered a brief quiz regarding the instructions. Participants then started the first trial. Participants made their first-period output choice for trial 1, decided whether to examine the result of this output choice, made their second-period output choice for trial 1, decided whether to examine the result of this output choice, and so on, until they made five output choices. At the end of each of the 12 trials, all participants received a summary of: (1) their output choice for each period in the trial, (2) the profit points earned from that output choice, (3) their point earnings for each period of the trial, (4) the time they took to complete the trial, and (5) the points they received for finishing at that time.

Participants then converted their points to cash. Participants drew a total of six lottery tickets (with replacement); one ticket for the points they earned in each of the five periods in the trial and one ticket for the points they earned from finishing the trial before three minutes. Thus, for each of the five output choices in a trial, participants could earn \$0.50 (\$2.50 per trial). For finishing each trial before three minutes, participants could earn an additional \$0.50.

After participants chose lottery tickets for each trial, the experimenter entered these numbers into the computer. Participants then received a summary of their earnings for that particular trial as well as a summary of their total earnings for all trials up to and including the most recent trial. Next, the clock was reset to three minutes and all participants started the next trial. At the end of the experiment (approximately 90 minutes), participants received their earnings in cash (average earnings were \$15.00).

IV. RESULTS

Hypothesis 1

Hypothesis 1 posits that participants receiving the incentive-based contract will exert more effort on the task than participants receiving the flat-wage contract. I measure effort via the amount of time participants spent on the task. Figure 1 and Table 3 present the average time (in seconds) spent on the task by compensation condition and by trial. For each trial, participants receiving the incentive-based contract spent more time on the task than participants receiving the flat-wage contract.

I tested H1 using an ANOVA with time (in seconds) per trial as the dependent variable, compensation condition as the between-subjects factor, and trial as the within-subjects (repeated-measures) factor.[8] Hypothesis 1 would be supported by a significant compensation condition main effect, where the mean time spent per trial is higher for participants receiving the incentive-based contract.

Table 3 documents that the average time spent on the task per trial was 62.02 seconds for participants in the incentive-based condition and 49.01 seconds for participants in the flat-wage condition. Table 4 indicates that the compensation condition main effect is statistically significant ($F = 10.87$, $p < 0.01$). Therefore, participants receiving the incentive-based contract spent significantly more time on the task than participants receiving the flat-wage contract. Table 4 also reveals a significant main effect for trial ($F = 54.69$, $p < 0.01$). Table 3 and Figure 1 show that in both compensation conditions, the average time spent on the task declined over trials (both trends are significant at $p \leq 0.01$). Beyond this, no other effects were significant at $p \leq 0.05$.

Hypothesis 2

Hypothesis 2 posits that participants receiving the incentive-based contract will earn more profit (i.e., perform better) than participants receiving the flat-wage contract. Figure 2 presents the average profit participants earned by compensation condition and by period within trial, with the bar representing the profit for period five under the first-best strategy. Table 5 presents the average profit by compensation condition and by trial, as well as profit under the first-best strategy by trial. For each trial, and generally for each period within a

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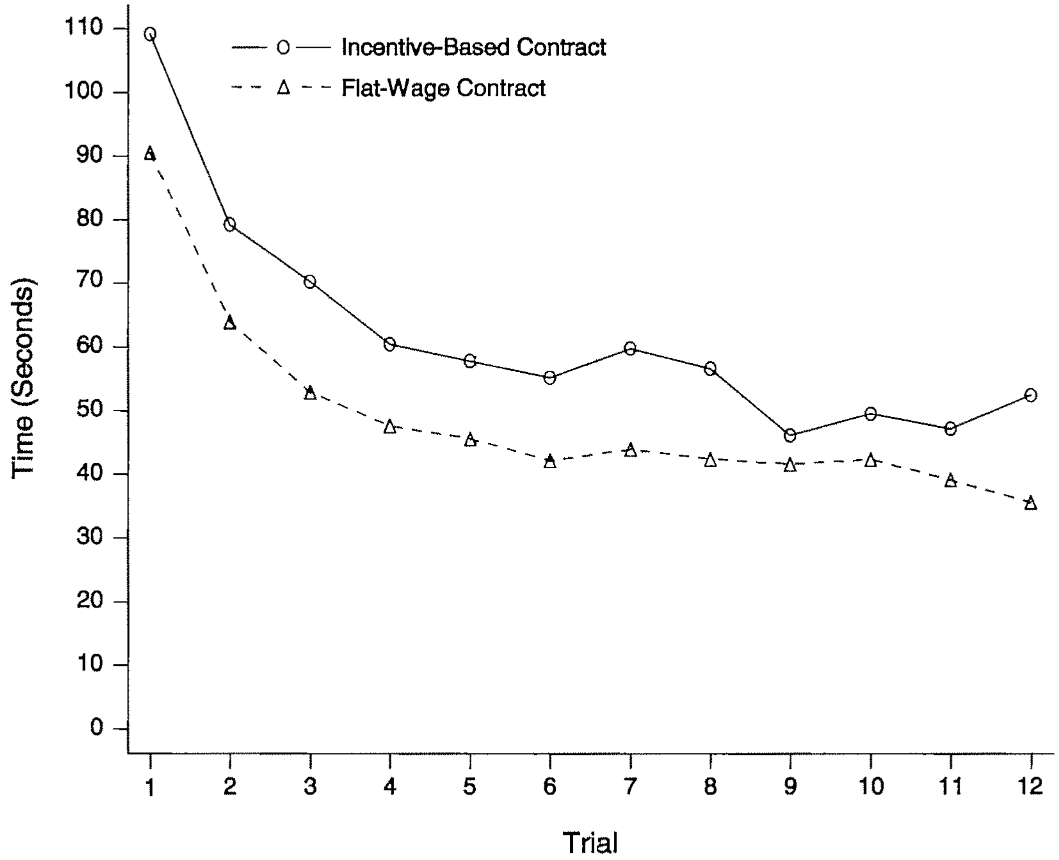
[8] Repeated-measures ANOVA requires that the differences for all treatment combinations be homogeneous (Huynh and Feldt 1970; Rouanet and Lepine 1970) and that the degree of covariation between all pairs of treatment scores be the same (Box 1954). Violations of these assumptions lead to overstated degrees of freedom in the F-ratio with a maximum reduction in the degrees of freedom to one in the numerator and $n_j - 1$ in the denominator. When necessary, the significance levels reported in the paper are adjusted using the Geisser and Greenhouse (1958) technique.

FIGURE 1
Average Time (in Seconds) Participants Spent on the Task by Compensation Condition and by Trial[a]



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[a] The 60 decision-making periods were partitioned into 12 independent trials, where each trial consisted of five periods in which the state of nature did not change from period to period. Participants under the incentive-based contract received the number of profit points they generated from their output choice in each of the five periods within a trial. Participants under the flat-wage contract received 40 points for each of the five periods within a trial regardless of the number of profit points generated from their output choices.

trial, participants receiving the incentive-based contract earned more profit than participants receiving the flat-wage contract.

I tested H2 using an ANOVA with total profit (in points) per trial as the dependent variable, compensation condition as the between-subjects factor, and trial as the within-subjects (repeated-measures) factor. Hypothesis 2 would be supported by a significant compensation condition main effect where the mean profit per trial is higher for participants receiving the incentive-based contract.

Table 5 shows that the average profit per trial was 203.48 points for participants in the incentive-based condition and 168.88 points for participants in the flat-wage condition.

TABLE 3
Average Time (in Seconds) Participants Spent on the Task by Compensation Condition and by Trial

		Compensation Condition[a]		
Trial[b]	*State of Nature (s)*[c]	*Incentive-Based Contract*	*Flat-Wage Contract*	*Difference*
1	17	109.21	90.58	18.63**
2	6	79.20	64.00	15.20***
3	14	70.33	52.90	17.43***
4	10	60.49	47.67	12.82**
5	7	57.82	45.63	12.19**
6	12	55.27	42.23	13.04**
7	4	59.85	43.94	15.91***
8	16	56.68	42.48	14.20***
9	11	46.18	41.65	4.53
10	6	49.49	42.36	7.13*
11	14	47.25	39.16	8.09**
12	17	52.49	35.57	16.92***
Average		62.02	49.01	13.01***

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*, **, and *** indicate significance at $p \leq 0.10$, $p \leq 0.05$, and $p \leq 0.01$ in one-tailed tests using time-per-trial as the dependent variable, respectively.

[a] Participants under the incentive-based contract received the number of profit points they generated from their output choice in each of the five periods within a trial. Participants under the flat-wage contract received 40 points for each of the five periods within a trial regardless of the number of profit points generated from their output choices.

[b] The 60 decision-making periods were partitioned into 12 independent trials, where each trial consisted of five periods in which the state of nature did not change from period to period.

[c] The realized state of nature (see Table 1).

Table 6 indicates that the compensation condition main effect is statistically significant ($F = 11.21$, $p < 0.01$). Therefore, participants receiving the incentive-based contract earned more profit than participants receiving the flat-wage contract. Table 6 also reveals a significant trial main effect ($F = 222.95$, $p < 0.01$). This effect is significant by design since the state of nature and, consequently, the maximum profit attainable, changes from trial to trial. Finally, Table 6 indicates that the compensation condition-by-trial interaction is significant, indicating that the effect of compensation condition differed across trials. Follow-up tests (shown in Table 5) indicated that the compensation condition simple effect was significant (at $p \leq 0.05$) in trials 4, 6, 8, 9, 10, 11, and 12. Although H2 was supported, there is no statistically significant difference in the profit performance between compensation conditions over the first three trials (smallest $p > 0.27$); it is not until the end of trial

TABLE 4
ANOVA on the Amount of Time (in Seconds) Participants Spent on the Task per Trial

Source of Variation	*SS*	*df*	*MS*	*F*[a]	*p*
Between Subjects					
Compensation Condition[b]	20,298.46	1	20,298.46	10.87	< 0.01
Subject(Compensation Condition)	70,972.13	38	1,867.69		
Within Subjects					
Trial[c]	115,435.25	11	10,494.11	54.69	< 0.01
Compensation Condition × Trial	2,122.75	11	192.98	1.01	< 0.44
Trial × Subject(Compensation Condition)	80,211.09	418	191.89		

[a] The Subject(Compensation Condition) mean square is the appropriate error term for Compensation Condition (the between-subjects effect). The Trial × Subject(Compensation Condition) mean square is the appropriate error term for the within-subjects effects.

[b] I manipulated Compensation Condition as a between-subjects factor with two levels, incentive-based and flat-wage. Participants in the incentive-based condition received the number of profit points they generated from their output choice in each of the five periods within a trial. Participants in the flat-wage condition received 40 points for each of the five periods within a trial regardless of the number of profit points generated from their output choices.

[c] I manipulated Trial as a within-subjects factor with 12 levels, 1–12. Participants in both compensation conditions completed 12 independent trials, where each trial consisted of five consecutive and related periods. Participants made a separate output choice for each of the five periods in a trial, and the state of nature did not change over these five-period intervals.

4 (period 20) that a marginally significant difference emerges ($t = 1.39$, $p < 0.10$, one-tailed).[9]

Hypothesis 3

Hypothesis 3 posits that the difference in the profit performance between participants receiving the incentive-based contract and participants receiving the flat-wage contract will increase over the course of the experiment. To test this hypothesis, I collapsed the data into two performance measures for each participant, an average profit per trial for trials 1–3 and an average profit per trial for trials 10–12. Recall that the states of nature for trials 1–3 were the same as the states of nature for trials 10–12. Although the order of these states of nature was randomized within trials 1–3 and trials 10–12, this allows me to make intertemporal comparisons in performance over the same set of state realizations.

Figure 3 presents the average profit participants earned per trial by compensation condition for trials 1–3 and 10–12. As shown in Figure 3 (and Table 5), participants in the incentive-based condition earned an average profit of 213.00 points per trial over trials 1–3, which is only 15.33 more points than the average profit of 197.67 points participants in the flat-wage condition earned per trial over trials 1–3. Consistent with H3, however, the average profit difference between compensation conditions is much greater in the last three trials than in the first three trials. Participants in the incentive-based condition earned an average profit of 251.58 points per trial over trials 10–12, which is 53.00 points higher

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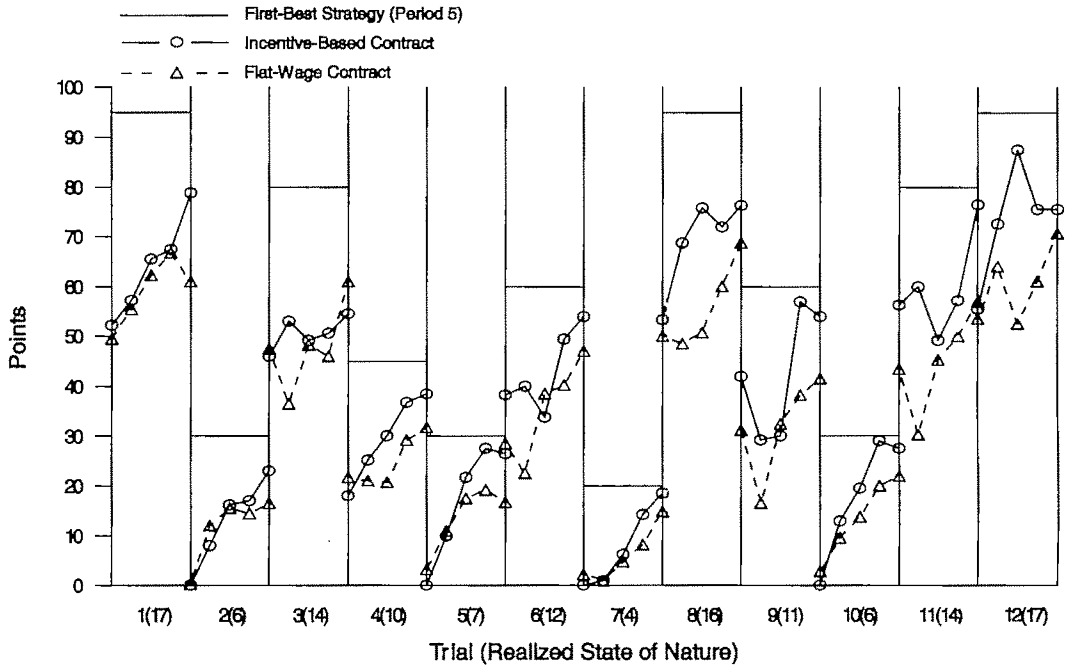
[9] These results are based on four separate ANOVAs conducted with the data from trial 1, trials 1 and 2, trials 1–3, and trials 1–4, using the dependent and independent variables employed to test H2.

FIGURE 2

Average Profit (in Points) Participants Earned on the Task by Compensation Condition and by Period Within Trial[a]



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[a] Participants under the incentive-based contract received the number of profit points they generated from their output choice in each of the five periods within a trial. Participants under the flat-wage contract received 40 points for each of the five periods within a trial regardless of the number of profit points generated from their output choices. All participants made output-quantity decisions in each of 60 periods. The 60 decision-making periods were partitioned into 12 independent trials, where each trial consisted of five periods in which the state of nature did not change from period to period. The bar represents the profit under the first-best strategy for period 5 (see Table 2).

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than the average profit of 198.58 points participants in the flat-wage condition earned per trial over trials 10–12.

To formally test the third hypothesis, I conducted an ANOVA with the average points per trial for trials 1–3 and 10–12 as dependent variables, compensation condition as the between-subjects factor, and trial (at two levels, 1–3 or 10–12) as the within-subjects (repeated-measures) factor. Table 7 indicates that the compensation condition-by-trial interaction is statistically significant ($F = 5.95$, $p < 0.02$). Therefore, the relative superiority of the profit performance of participants receiving the incentive-based contract increased over the course of the experiment.[10]

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[10] Prior research has not used time-based opportunity costs to induce effort aversion. To examine whether this manipulation affected participants' effort levels and output choices, I ran an additional experiment with the same task and setting, but participants were not compensated for finishing each trial before three minutes. Twenty new participants were assigned to each compensation condition. The results support all hypotheses (one-tailed $p < 0.10$, 0.02, and 0.01 for H1, H2, and H3, respectively), indicating that the results are robust with respect to the presence of time-based opportunity costs.

TABLE 5
Average Profit Performance (in Points) by Compensation Condition and by Trial

Trial[b]	*State of Nature (s)*[c]	*First-Best Strategy*[d]	*Compensation Condition*[a] *Incentive-Based Contract (1)*	*Flat-Wage Contract (2)*	*Difference (1) − (2)*
1	17	460.00	321.25	295.00	26.25
2	6	90.00	64.25	58.75	5.50
3	14	320.00	253.50	239.25	14.25
4	10	135.00	148.50	124.50	24.00**
5	7	90.00	85.75	67.75	18.00*
6	12	225.00	215.50	176.50	39.00**
7	4	40.00	40.00	31.00	9.00*
8	16	460.00	346.00	278.00	68.00***
9	11	225.00	212.25	160.00	52.25**
10	6	90.00	89.00	68.00	21.00**
11	14	320.00	299.25	226.00	73.25***
12	17	460.00	366.50	301.75	64.75***
Average		243.00	203.48	168.88	34.60***

*, **, and *** indicate significance at $p \leq 0.10$, $p \leq 0.05$, and $p \leq 0.01$ in one-tailed tests using profit (in points) per trial as the dependent variable, respectively.

[a] Participants under the incentive-based contract received the number of profit points they generated from their output choice in each of the five periods within a trial. Participants under the flat-wage contract received 40 points for each of the five periods within a trial regardless of the number of profit points generated from their output choices.

[b] The 60 decision-making periods were partitioned into 12 independent trials, where each trial consisted of five periods in which the state of nature did not change from period to period.

[c] The realized state of nature (see Table 1).

[d] Based on the first-best sequence of output choices and the resulting total profit in points earned from these output choices for each realized state of nature (see Table 2).

The Association between the Duration of Effort and Performance

Tables 3–7 present evidence that incentive-based contracts increase effort and performance. I now assess the extent to which the incentive-based contract affected performance through its effect on the duration of effort (Libby and Lipe 1992). I conducted an ANCOVA with total points per trial as the dependent variable, compensation condition and trial as independent variables, and time (per trial) and the time-by-compensation condition interaction as covariates.[11] The results of this ANCOVA indicate that the time main effect is

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[11] While researchers often use ANCOVA to control a concomitant variable, it is also useful for analyzing a single quantitative dependent variable and both quantitative and qualitative (categorical) independent variables. As discussed in Wildt and Ahtola (1978, 8), this is analogous to performing a regression analysis with dummy variables.

TABLE 6
ANOVA on the Amount of Profit (in Points) Participants Earned on the Task per Trial

Source of Variation	*SS*	*df*	*MS*	*F*[a]	*p*
Between Subjects					
Compensation Condition[b]	143,693.80	1	143,693.80	11.21	< 0.01
Subject(Compensation Condition)	487,030.72	38	12,816.60		
Within Subjects					
Trial[c]	5,057,610.57	11	459,782.78	222.95	< 0.01
Compensation Condition × Trial	64,081.82	11	5,825.62	2.82	< 0.02
Trial × Subject(Compensation Condition)	862,043.02	418	2,062.30		

[a] The Subject(Compensation Condition) mean square is the appropriate error term for Compensation Condition (the between-subjects effect). The Trial × Subject(Compensation Condition) mean square is the appropriate error term for the within-subjects effects.

[b] I manipulated Compensation Condition as a between-subjects factor with two levels, incentive-based and flat-wage. Participants in the incentive-based condition received the number of profit points they generated from their output choice in each of the five periods within a trial. Participants in the flat-wage condition received 40 points for each of the five periods within a trial regardless of the number of profit points generated from their output choices.

[c] I manipulated Trial as a within-subjects factor with 12 levels, 1–12. Participants in both compensation conditions completed 12 independent trials, where each trial consisted of five consecutive and related periods. Participants made a separate output choice for each of the five periods in a trial, and the state of nature did not change over these five-period intervals.

not statistically significant in explaining performance ($F = 1.23$, $p < 0.27$). The time-by-compensation condition interaction, however, is statistically significant ($F = 46.63$, $p < 0.01$), indicating that the effect of the duration of effort on performance differed between compensation conditions.[12]

Since the time-by-compensation condition interaction was significant, I examined the simple effect of time at each level of compensation condition. In the incentive-based condition, the simple effect of time is significant ($F = 53.49$, $p < 0.01$), and the total time spent on the task is *negatively* correlated with total performance ($\rho = -0.73$, $p < 0.01$). In the flat-wage condition, the simple effect of time is also significant ($F = 10.77$, $p < 0.01$), but the total time spent on the task is *positively* correlated with total performance ($\rho = 0.45$, $p < 0.05$).

The negative relation between the amount of time spent on the task and performance in the incentive-based condition can be partially understood as follows. The first-best strategy calls for participants to use feedback to change their output choices up to some period t, and then maintain the same output choice from period t to period 5 (see Table 2). However, if participants "oversearch," then time increases (to examine the extra feedback), yet profit will likely decrease if participants increase their output choice beyond the optimal point. For example, assume that the realized state of nature is 17 (as in trials 1 and 12). Next, assume that two participants choose 14 as their first-period output. In period 2, after requesting feedback in period 1, both participants increase their output choice to 16. In periods 3, 4 and 5, the first participant follows the first-best strategy and stays with an

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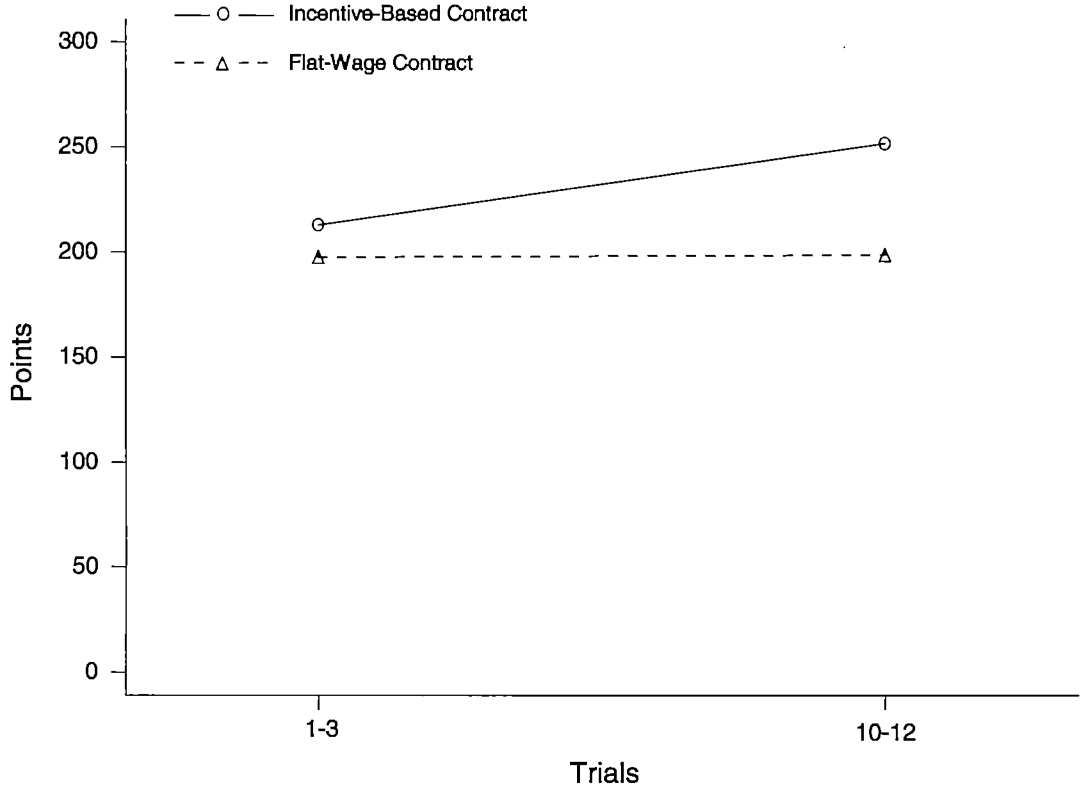
[12] An alternative measure of effort is the number of times participants requested feedback. However, the correlation between the time spent per trial and the number of times participants requested feedback was 0.73 ($p < 0.01$), so this alternative measure of effort led to qualitatively similar inferences.

FIGURE 3
Average Profit (in Points) Participants Earned on the Task per Trial by Compensation Condition for Trials 1–3 and 10–12[a]



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[a] Participants under the incentive-based contract received the number of profit points they generated from their output choice in each of the five periods within a trial. Participants under the flat-wage contract received 40 points for each of the five periods within a trial regardless of the number of profit points generated from their output choices. The 60 decision-making periods were partitioned into 12 independent trials, where each trial consisted of five periods in which the state of nature did not change from period to period. To examine differences in performance between compensation conditions over the course of the experiment, I designed the experiment so that the first three states of nature were the same as the last three states of nature. However, within trials 1–3 and 10–12, the order of these states of nature was randomized.

output choice of 16. In period 3, however, the second participant chooses 19, requests feedback and realizes that profit was 0 at that choice; he then goes back to an output choice of 16 in periods 4 and 5. Thus, the first participant spent 20+ seconds on the task (because he examined feedback two times) and earned 460 profit points, whereas the second participant spent 30+ seconds on the task (because he examined feedback three times) and yet earned only 365 profit points.

Further analysis suggests that many participants in the incentive-based condition did engage in such "oversearching" behavior. While the first-best strategy predicts that participants will request feedback 32 times in the experiment, participants in the incentive-based

TABLE 7
ANOVA on the Average Amount of Profit (in Points) Participants Earned on the Task per Trial for Trials 1–3 and Trials 10–12

Source of Variation	*SS*	*df*	*MS*	F^a	*p*
Between Subjects					
Compensation Condition[b]	23,347.22	1	23,347.22	7.33	< 0.01
Subject(Compensation Condition)	120,996.52	38	3,184.12		
Within Subjects					
Trial[c]	7,801.24	1	7,801.24	6.55	< 0.02
Compensation Condition × Trial	7,093.88	1	7,093.88	5.95	< 0.02
Trial × Subject(Compensation Condition)	45,285.41	38	1,191.72		

[a] The Subject(Compensation Condition) mean square is the appropriate error term for Compensation Condition (the between-subjects effect). The Trial × Subject(Compensation Condition) mean square is the appropriate error term for the within-subjects effects.

[b] I manipulated Compensation Condition as a between-subjects factor with two levels, incentive-based and flat-wage. Participants in the incentive-based condition received the number of profit points they generated from their output choice in each of the five periods within a trial. Participants in the flat-wage condition received 40 points for each of the five periods within a trial regardless of the number of profit points generated from their output choices.

[c] The 60 decision-making periods were partitioned into 12 independent trials, where each trial consisted of five periods in which the state of nature did not change from period to period. To examine differences in performance between compensation conditions over the course of the experiment, I designed the experiment so that the first three states of nature were the same as the last three states of nature (although within trials 1–3 and 10–12, the order of these states of nature was randomized). To test for intertemporal differences in performance between compensation conditions, I collapsed the data into two performance measures for each participant, an average profit (in points) per trial for trials 1–3 and an average profit (in points) per trial for trials 10–12. In this ANOVA, Trial is a within-subjects factor with two levels, 1–3 or 10–12.

condition examined feedback an average of 38.40 times. This "oversearching" behavior likely explains the negative relation between the duration of effort and performance in the incentive-based condition.

The positive relation between the amount of time spent on the task and performance in the flat-wage condition is likely attributable to the opposite phenomenon. While some participants receiving the flat-wage contract "oversearched" in relation to the first-best strategy, several participants in this condition made mostly random or myopic choices as theory predicts (i.e., "undersearched" in relation to the first-best strategy).[13] For these latter participants, the amount of time spent on the task is close to zero because they rarely requested feedback and, as a consequence, they generally earned much less profit than participants who examined and used feedback information. The positive relation between the duration of effort and performance in the flat-wage condition is thus largely attributable to the differences between: (1) participants who infrequently requested feedback and, as a result, performed poorly, and (2) participants who frequently requested and used feedback and, as a result, improved their performance on the task.

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[13] Participants in the flat-wage condition examined feedback only an average of 28.50 times (compared to the first-best strategy prediction of 32), with 25 percent (five) of these participants requesting feedback less than 15 times. In general, participants in the flat-wage condition continually "undersearched" across trials and moved away from the first-best strategy, but toward the theoretical prediction for this condition (i.e., no searching), by the end of the experiment. In the incentive-based condition, participants continually "oversearched" across trials, although they moved toward the first-best strategy prediction by the end of the experiment.

Collectively, the relations between the duration of effort and performance in each compensation condition are consistent with participants deriving both intrinsic and extrinsic rewards from the task. Subsequent analysis suggests that participants receiving the flat-wage contract likely received some intrinsic rewards from exerting effort on the task. However, in the absence of extrinsic rewards, the resulting effort is likely insufficient to maximize performance. Therefore, in the flat-wage condition the effort/performance observations tend to be in the region where performance is increasing in effort. On the other hand, the presence of both intrinsic and extrinsic rewards may have led participants in the incentive-based condition to choose an effort level beyond the point at which their monetary reward (measured performance) is maximized. Therefore, in the incentive-based condition the effort/performance observations tend to be in the region where performance is decreasing in effort.

Finally, while the overall association between the amount of time spent on the task and performance on the task is not statistically significant, spending additional time on the task tended to improve performance later in the experiment. Across compensation conditions, the correlation between the total time spent on the task and performance on the last six trials is 0.26, $p < 0.06$ (similar results hold for the last three trials and the last trial). Thus, working longer on the task did not necessarily pay off in the short-run, but it did enable participants to develop strategies for better performance in the long-run, consistent with the performance interaction shown in Figure 3.

The Effect of Incentives on Performance After Controlling for the Duration of Effort

While the current study measures effort via the amount of time spent on the task, effort may vary both in duration and intensity (Kanfer 1990; Libby and Lipe 1992).[14] If incentives enhance performance even after controlling for the amount of time spent on the task (duration of effort), then it can be inferred that incentives also improved performance by increasing the intensity of effort.

To examine the effect of incentives on performance after controlling for the duration of effort, I added both time (per trial) and the time-by-compensation condition interaction as covariates to the model used to test H2. The compensation condition main effect remains statistically significant ($t = 1.89$, $p < 0.05$). Further analysis indicates that performance is higher under the incentive-based contract, even after controlling for the amount of time spent on the task. Therefore, the experiment's results suggest that incentives enhanced performance not only by increasing the amount of time devoted to the task, but also by improving the quality of attention participants devoted to the task and, consequently, their analysis and use of information.

Additional Analysis

Learning within a Trial

Figure 2 shows that in both compensation conditions, average profit performance increased from period 1 to period 5 within each of the 12 trials. A paired t-test indicates that profit performance increased significantly (at $p \leq 0.05$) from period 1 to period 5 in 8 of the 12 trials in the flat-wage condition (trials 1, 3, 4, and 9 are the exceptions) and in 11 of the 12 trials in the incentive-based condition (trial 3 is the exception).

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[14] Kanfer (1990) suggests that effort intensity captures the amount of attention an individual devotes to a task during a fixed amount of time. Similarly, Libby and Lipe (1992) suggest that effort intensity refers to how hard an individual works, while effort duration refers to how long an individual works.

I expected this result in the incentive-based condition because these participants should request feedback information to update and improve their output choices over periods within each trial. For the flat-wage condition, however, the results are inconsistent with the theoretical prediction. For participants receiving the flat-wage contract, a random or myopic strategy is optimal because these participants have an incentive to perform the task as quickly as possible, and not to request or use information for belief-revision purposes. So, their period 1 profit performance should not differ from their period 5 profit performance. However, many participants in the flat-wage condition do not follow this strategy. Moreover, participants receiving the flat-wage contract earned an average of 168.88 points per trial, well above ($p < 0.01$) the expected profit under a random strategy of 92.81 points per trial (given the realized states of nature). Given the economic incentives in the flat-wage condition, this result further suggests that many of these participants were intrinsically motivated to perform well on the task. This finding is also consistent with prior assertions that individuals derive utility from work activities (e.g., Deci and Ryan 1985; Holmstrom and Milgrom 1991; Simon 1991).

Figure 2 also shows that the average profit difference between participants receiving the incentive-based contract and participants receiving the flat-wage contract is higher in period 5 (an average difference of 8.14 points) than in period 1 (an average difference of 2.29 points) for ten of the 12 trials (trials 3 and 6 are the exceptions). A repeated-measures ANOVA, conducted on a trial-by-trial basis with the points per period for periods 1 and 5 within each trial, indicates, however, that the compensation condition-by-period interaction is statistically significant (at $p \leq 0.05$) in only three of the 12 trials (trials 5, 7, 10). This provides some evidence of differences in learning between compensation conditions within a trial (the lack of significance in other trials is partly due to variability across participants in the period-by-period profit performance within each trial).

First-Best Choices

Fewer than 1 percent of participants' output choice sequences in each trial were consistent with the first-best sequence. In the incentive-based condition, four of the 240 (20 participants × 12 trials) output choice sequences were consistent with the first-best sequence. In the flat-wage condition, none of the output choice sequences were first-best. This result was partially driven by participants' initial (period 1) output choice in each trial. The average first-period output choice (standard deviation) was 10.96 (2.31) and 10.60 (3.42) in the incentive-based and flat-wage conditions, respectively; recall that the first-best first-period output choice is 14. A repeated-measures ANOVA using the first-period output choice as the dependent variable revealed no significant differences in first-period output choices between compensation conditions, either overall or across trials. Moreover, participants' first-period output choices did not differ significantly from the optimal choice in the one-period maximization problem (i.e., 11).

Given the information set generated by a participant's first-period choice, however, it is possible to calculate the first-best strategy for the remaining four choices. When period 2, 3, 4, and 5 output choices are conditioned on the first-period choice, 74 (31 percent) of the output choice sequences in the incentive-based condition were consistent with the first-best strategy; 26 in trials 1–6 and 48 in trials 7–12. In the flat-wage condition, only 28 (12 percent) of the output choice sequences were consistent with the first-best strategy; nine in trials 1–6 and 19 in trials 7–12.[15] Overall, these results indicate that: (1) conditioned on the first-period output choice, participants receiving the incentive-based contract developed strategies more consistent with the first-best strategy than participants receiving the flat-wage contract, and (2) participants' output choices generally became more consistent with the first-best sequence over the course of the experiment.

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[15] The period 3, 4, and 5 output choices can be conditioned on the period 1 and 2 output choices, etc. In both conditions, participants' output choice sequences became more optimal as t went from 1 to 5.

Dominated Choices

Notice from Table 1 that 11 of the 20 output choices are dominated.[16] I included the dominated choices to see if participants learned not to select dominated alternatives (Cooper et al. 1990). In the incentive-based condition, 26.33 percent of the participants' choices were dominated; 33.33 percent in trials 1–6 and 19.33 percent in trials 7–12. In the flat-wage condition, 48.67 percent of the participants' choices were dominated; 52.17 percent in trials 1–6 and 45.17 percent in trials 7–12. A repeated-measures ANOVA using the percentage of dominated choices as the dependent variable indicated significant main effects for both compensation condition and trial (both p's < 0.01). Beyond this, no other effects were significant at $p \leq 0.05$. Therefore, participants receiving the incentive-based contract made fewer dominated choices than participants receiving the flat-wage contract, again suggesting that participants receiving the incentive-based contract employed a strategy more consistent with profit maximization.

V. SUMMARY AND DISCUSSION

This study provides experimental evidence regarding how incentive-based compensation contracts compare to flat-wage compensation contracts in motivating individual learning and performance. The experiment's results support the hypothesis that participants receiving the incentive-based contract spend more time on the task than participants receiving the flat-wage contract. In contrast to previous multiperiod experimental research (e.g., Arkes et al. 1986; Ashton 1990; Hogarth et al. 1991), but consistent with theory, participants receiving the incentive-based contract also performed better on the task than participants receiving the flat-wage contract. However, the incentive-based contract induced better performance only after the first 15 of the 60 experimental periods. Finally, incentives significantly enhanced performance even after controlling for the duration of effort (amount of attention), suggesting that incentives also increased the intensity of effort (quality of attention).

This study makes a number of contributions. First, the results provide an explanation for prior studies' failure to find incentive effects in decision-making experiments that examine learning from feedback (e.g., Arkes et al. 1986; Ashton 1990; Hogarth et al. 1991). My results suggest that individuals receiving an incentive-based contract are likely to perform better than individuals receiving a flat-wage contract if: (1) the form of the incentive contract motivates profit maximization, and (2) the feedback provided for belief-revision purposes helps individuals make better decisions. Thus, concerns that performance-based monetary incentives increase pressure and discourage risk-taking, creativity, and innovation may not be justified.

Second, the results suggest that incentive-based compensation contracts increase the rate of learning and accelerate the learning curve (Levy 1965; Teplitz 1991). Given recent emphasis on continuous improvement and enhancing productivity (e.g., Atkinson et al. 1997; Hilton et al. 2000; Horngren et al. 2000), firms are likely to embrace factors that motivate employees to use resources more effectively and efficiently. Evidence that incentive-based compensation contracts appear to promote learning suggests that using accounting information for contracting can help firms gain a competitive advantage. This may explain why organizations are increasingly linking pay to performance (*Wall Street Journal* 1999).

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[16] Output choices 2, 5, 7, 8, 10, 12, 13, 15, 17, 18, and 20 are dominated. For example, output choices 17 and 18 are dominated by output choice 16. All three choices have the same possible profit (95 points), but output choice 16 minimizes the risk of earning this profit.

Third, the results help reconcile conflicting prior evidence in the incentive-contracting literature. Evidence that monetary incentives increase effort and performance is consistent with the results of experiments where the task is more physical than cognitive (e.g., Young and Lewis 1995; Bailey et al. 1998; Bonner, Hastie, Sprinkle, and Young 1999), but inconsistent with the results of many experiments where the task is purely cognitive (e.g., Kohn 1993; Bonner and Sprinkle 1999). My study's results indicate that initial performance on a cognitive task may not be highly sensitive to the increased effort induced by incentives, but subsequent improvements in performance are more likely to depend on motivation. Thus, experience and feedback may be necessary before incentives improve performance on more complex judgment tasks.

Evidence that the positive difference in profit performance between participants receiving the incentive-based contract and participants receiving the flat-wage contract increases significantly over the course of the experiment may also help explain why, relative to prior experimental research, archival empirical research more frequently reports a positive relation between pay and performance (e.g., Prendergast 1999). That is, in contrast to experimental studies, archival empirical studies typically use performance measures that reflect decisions over a relatively long period of time.

Finally, incentives not only increase the duration of effort but they also appear to increase the intensity of effort. Even after controlling for the increased time spent on the task, incentives still improved performance. This finding, in conjunction with the supplemental analyses, provides evidence that incentives improve individuals' analysis and use of feedback information and encourage them to develop strategies to maximize performance. Thus, in addition to motivating individuals to work longer, incentives also appear to motivate individuals to work smarter.

Overall, the results suggest that the belief revision and contracting uses of managerial accounting information are not independent. Belief-revision feedback information enabled participants to learn, but the magnitude of this learning increased when participants had more incentive to learn. While the study's general conclusions are consistent with economic theory, the dynamics regarding the process and rate of learning indicate that considerable feedback and experience with the task were necessary for the incentive-based contract to improve performance.

Like all research, this study is subject to limitations. I examined the effect of incentives on individual learning and performance using only one type of task and one type of incentive scheme. Accountants in practice and academe, however, are interested in the determinants of performance in a variety of tasks, including production and clerical tasks, memory tasks, judgment tasks, choice tasks, and problem-solving and reasoning tasks. Further, many different types of incentive compensation schemes are used in practice and are of interest to accounting researchers, including quota and budget-based schemes, piece-rate schemes, profit-sharing schemes, and tournament schemes. Finally, accounting researchers are interested not only in individual learning, but also in learning in workgroups and teams. Future research might investigate whether the results of this study generalize to other types of tasks, compensation contracts, and learning situations.

The study's results suggest other possibilities for further inquiry. For example, this study considered a single, one-dimensional task. However, individuals often perform multiple tasks or a single task with multiple dimensions (Holmstrom and Milgrom 1991;

Feltham and Xie 1994). In such situations, incentive-based compensation serves both a motivational role and a role in directing individuals' effort and attention among their various responsibilities. Holmstrom and Milgrom (1991) demonstrate analytically that when the ability to measure performance varies across tasks, a flat-wage contract may be optimal. However, this result hinges on the assumption that individuals derive utility from work activities. The effort and performance results I obtained suggest that individuals receiving the flat-wage contract derived some pleasure from working. Thus, an extension of the current study to a multi-task setting may prove interesting.

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The Effects of Audit Quality and Consequence Severity on Juror Evaluations of Auditor Responsibility for Plaintiff Losses

Kathryn Kadous
University of Washington

ABSTRACT: This study investigates whether providing higher quality audits increases auditors' chances of avoiding legal liability. Negligence rules hold auditors responsible for plaintiff losses only when the quality of the audit provided fails to meet standards of care. The results of my experiment suggest that the *ex post* observed consequences of audit failure can affect the standards of care to which jurors hold auditors. Specifically, participants serving in the role of jurors assessed higher standards of care for auditors when the consequences of audit failure were more severe. Furthermore, when the consequences of audit failure were more severe, participants' evaluations of the auditor did *not* depend on the quality of the audit provided—auditors who provided higher quality audits were evaluated just as negatively as those who provided lower quality audits. In contrast, when audit failure led to only moderately negative consequences, auditors who provided higher quality audits received more favorable evaluations. These results suggest that providing higher quality audits will not necessarily protect auditors from legal liability when the consequences of audit failure are severe.

Key Words: *Auditor liability, Litigation, Audit quality, Standard of care.*

Data Availability: *Contact author.*

I. INTRODUCTION

Audit failure occurs when an auditor issues an unqualified opinion on financial statements that are subsequently found to have been materially misstated. The legal standard for negligence holds auditors responsible for performing an audit of a

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minimum quality level, and performance of such an audit should relieve the auditor of liability for subsequent audit failure (Causey and Causey 1991, 139).[1] The purpose of this paper is to investigate whether the level of audit quality provided (an *ex ante* decision) affects auditors' chances of being held liable for losses associated with subsequent audit failure.

The minimum audit quality level required to avoid legal liability for audit failure is vague, and thus requires interpretation. Jurors in audit negligence cases must determine what that level is—that is, they must assess standards of care—in order to evaluate whether the audit work performed was sufficient to avoid liability. Although standards of care are vague, the law contemplates that they are set *ex ante*. However, in this paper I argue that juror standards of care depend on the *ex post* observed consequences of audit failure. Specifically, I argue that observing severe adverse consequences of audit failure (such as client firm failure, employee job loss, and widespread losses suffered by parties external to the litigation) causes jurors to assess higher standards of care than does observing less severe consequences.

When standards of care are set *ex ante*, auditors can improve their chances of avoiding liability for audit failure by conducting higher quality audits. However, if standards of care depend on actual outcomes or consequences, then performing higher quality audits may not protect auditors from legal liability when the consequences of audit failure are severe. That is, because jurors set higher standards of care when consequences are severe, they are more likely to find that auditors have not met those standards, even when audits are of relatively high quality. However, when consequences are less severe, jurors are more likely to differentiate among levels of audit quality, and higher levels of audit quality should result in more positive evaluations of auditors.

I investigated these issues by conducting an experiment in which participants serving in the role of jurors evaluated an auditor involved in an audit failure and answered questions about their expectations of auditors. I constructed standard-of-care measures from the expectation items. I manipulated audit quality by varying whether the auditor performed a diagnostic audit procedure that is recommended, but not required, by generally accepted auditing standards. Consequence severity was manipulated by varying the losses suffered by parties external to the litigation. Consequence severity, though irrelevant to the merits of the legal case against the auditor, was expected to influence juror standards of care.

Consistent with expectations, when the consequences of audit failure were severe, participants assessed higher standards of care for two important aspects of an auditor's work: the type of audit tests performed and the level of professional skepticism auditors maintain while performing audits. Further, audit quality and consequence severity jointly influenced participant evaluations of the auditor. Specifically, audit quality influenced evaluations when the adverse consequences of audit failure were moderate, but participants evaluated auditors as if they did not consider audit quality when the consequences were severe.

This study contributes to the accounting literature by demonstrating that standards of care for auditors are moving targets in that they depend on the severity of the consequences of audit failure. Prior research assumes that standards of care are set *ex ante*, and that auditors can increase their chances of meeting such standards, and of avoiding liability, by increasing audit quality (e.g., Schwartz 1997, 390; Radhakrishnan 1999, 228). The current results suggest otherwise. Because standards of care depend on the *ex post* observed consequences of audit failure, auditors may be unable to predict such standards *ex ante*. As a result, auditors may be unable to bridge the expectation gap by changing their *ex ante* audit decisions, as has been suggested by prior research (e.g., Kinney and Nelson 1996, 293).

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[1] Audit quality is defined as the level of audit assurance provided given the procedures performed and judgments made. This is consistent with DeAngelo's (1981) definition of audit quality as the probability that a financial statement misstatement is both detected and reported.

In the next section, I develop hypotheses. Section III presents the experimental design and method, and Section IV describes the results of the tests of hypotheses. The final section contains a summary and conclusions.

II. DEVELOPMENT OF HYPOTHESES

Consequence Severity and Standards of Care

Auditors have a duty to exercise the usual judgment, care, skill, and diligence employed by other auditors (Causey and Causey 1991, 18). Thus, jurors evaluating auditors in negligence lawsuits are asked to compare the audit performed with a vague standard of care—what other audit professionals would have done in the circumstances. If the audit falls short of this standard of care, the auditor is found negligent. Researchers typically conceptualize the standard of care as vague and unknown *ex ante*, but independent of realizations such as the severity of consequences of audit failure (e.g., Dye 1995, 81). Under these conditions, auditors cannot precisely predict the standard to which they will be held, but they can improve the probability of avoiding liability by applying additional audit effort (Schwartz 1997, 390; Radhakrishnan 1999, 228) or by making more conservative reporting judgments (Kinney and Nelson 1996, 293).

Research in nonlitigation contexts raises questions about the appropriateness of this conceptualization. In particular, this research indicates that standards of care likely increase with consequence severity, a legally irrelevant case feature. For example, Walster (1966) found that participants rated the importance of regularly checking brakes more highly when told that the consequences of an auto accident involving faulty brakes were more severe. Baldwin and Kleinke (1994) found that a drunk driver was considered more reckless when accident damage was severe vs. moderate. Severe consequences apparently increase the importance of performing certain role-related tasks (e.g., checking safety equipment and remaining sober), thereby increasing standards of care.

In an audit negligence setting, I expect that severe consequences cause a similar retrospective increase in juror standards of care for auditors. Regardless of audit quality, plaintiffs' attorneys argue that if the auditor had performed more extensive tests, performed higher quality tests, or maintained a higher level of professional skepticism, the audit would have revealed material misstatements. Moreover, these attorneys identify specific audit procedures that would have diagnosed the misstatement. By contrast, defense attorneys typically argue that the additional procedures would not have been performed by other auditors and thus were not required. I expect that severe consequences will enhance the apparent importance of omitted procedures, rendering less plausible defense arguments that these procedures were not required. Thus, when consequences are severe, jurors will be more likely to view the omitted procedures as necessary and standards of care will be higher.

> **H1:** Standards of care will be higher when the consequences of audit failure are severe than when the consequences of audit failure are moderate.

This prediction is important because it implies that standards of care are moving targets. Recent research suggests that the expectation gap might not be as problematic as previously thought, because auditors can balance high *ex post* expectations with *ex ante* conservatism (Kinney and Nelson 1996, 293). The above hypothesis, however, suggests the contrary. Because severe consequences highlight the importance of what was not done, the audit quality that jurors (and presumably financial statement users) expect from auditors will be higher when severe consequences occur, making the standards difficult to attain. Thus, *ex ante* conservatism may not protect auditors when severe consequences occur.

Audit Quality, Consequence Severity, and Evaluations

Accounting firms and industry observers express doubts that jurors can provide merit-based verdicts in complex civil cases (e.g., Arthur Andersen & Co. et al. 1992, 20; Lochner 1993, 93). However, limited empirical evidence supports the contention that jurors, with the help of attorneys, are able to understand the essence of complex legal and technical issues. For example, attorneys for both plaintiffs and defendants in medical malpractice cases believe that jurors can follow the evidence, which is typically complex and technical, and can understand the legal issues in such cases (Guinther 1988, 100). Judges and jurors themselves are confident that jurors make fair and appropriate decisions (Guinther 1988, 100). This suggests that jurors, with the help of attorneys, can understand enough evidence about audit issues to identify different levels of audit quality. Accordingly, I expect that when consequences are moderate and standards of care are at normal levels, audit quality will affect juror evaluations of auditors. Jurors will be able to identify auditors who do not meet the standards because expert witnesses and attorneys will point out procedures that others would have done. The auditor's work will fall short and the auditor will receive low evaluations. Auditors who perform higher quality audits in this situation will be rewarded with higher evaluations.

When consequences are severe, however, I expect standards of care to increase (H1). Prior research suggests that severe outcomes can dominate other information normally relevant to attributions of blame. For example, severe consequences appear to cause individuals to ignore causality information and respond with high attributions of blame regardless of other information provided (Fincham 1982). A similar effect could occur in audit litigation if severe consequences increase standards of care to unattainable levels. In this case, jurors would give uniformly low evaluations of auditors regardless of the level of audit quality provided. In other words, when consequences are severe, I expect that juror evaluations of auditors will be low, and they will be made as if audit quality were not considered. In sum, I expect consequence severity, a legally irrelevant case feature, to moderate the relation between audit quality and juror evaluations.

> **H2:** When consequences of audit failure are moderate, evaluations of auditors will be higher for higher quality audits than for lower quality audits; however, when consequences are severe, evaluations will be low irrespective of the level of audit quality.

The above prediction implies that performing higher quality audits can protect auditors against liability for audit failures when the consequences of audit failure are moderate, but may not provide protection when the consequences of audit failure are severe.

Juror vs. Jury Decisions

In this study, I examine the effects of two important variables on juror predeliberation evaluations of auditors. Although *jury* evaluations (i.e., group decisions) are of ultimate concern, studying individual predeliberation evaluations rather than jury evaluations allows for more efficient tests with little cost in terms of explaining jury evaluations. Prior research using interview data from jurors in real criminal trials finds that the jury's ultimate verdict matches the first-ballot result in at least 90 percent of the trials studied (Kalven and Zeisel

1966; Sandys and Dillehay 1995). This research also demonstrates that the relation between first-ballot votes and jury decisions is not affected by the nature of the deliberation process or by the amount of discussion that precedes the first ballot (Sandys and Dillehay 1995).

Experimental studies allow researchers to develop and fit models mapping the initial pattern of juror predeliberation verdicts into jury verdicts. These studies typically find that the predeliberation verdict pattern is the only significant explanatory variable for jury decisions, and that juries behave as though they were assigned a decision rule requiring them to decide with a two-thirds majority or otherwise hang, regardless of the assigned decision rule or jury size (see Davis [1980] for a summary). Thus, research based on both retrospective interviews of jurors in real trials and on experimental trials implies that juror initial verdict choices map into jury verdict choices in a straightforward way. Therefore, juror predeliberation evaluations are a reasonable proxy for jury decisions. Further, focus on individual juror decisions may be appropriate since jury size and decision rule vary across jurisdictions (Kassin and Wrightsman 1988).

III. EXPERIMENTAL DESIGN AND METHOD

Participants

I tested the hypotheses in an experiment in which I manipulated audit quality and consequence severity between subjects in a 2 × 2 full-factorial design. I recruited jury-eligible participants through a mailing to people who had recently been called to jury duty (23 participants), a mailing to addresses randomly selected from the telephone directory (55), and personal contact in an introductory economics course and in campus study areas (29).[2] Participants completed the study in groups of one to 20. I was present to give instructions and answer questions at all sessions. All participants were paid $10 for their time, and one participant was randomly selected to win a $500 prize.

Materials and Experimental Procedure

Participants listened to an audio tape summarizing a negligence lawsuit that a client company's creditor had filed against an auditor. The suit alleged that the company's inventory account was materially misstated. A written copy (transcript) of the case was also provided. The case included the plaintiff's complaint, the respondent's answer, attorneys' opening and closing statements, witness testimony providing background information, expert witness testimony for each party to the litigation, and the judge's instructions to the jury.

An extensive body of juror decision-making research demonstrates that case format influences verdicts, confidence in verdicts, and memory for evidence (see Pennington and Hastie [1993] for a summary). My experimental materials enhanced external validity by incorporating important structural features of trials and by maintaining the natural order of testimony. For example, attorneys summarized information important to their cases in their opening and closing statements, expert witnesses gave opposing views regarding the quality of the audit work based on the same fact pattern, and a judge's instructions were provided. An attorney who practices primarily in audit negligence cases reviewed the pilot materials for realism, and I incorporated his suggestions into the final materials.

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[2] This study was part of a larger one with 330 participants. Two hundred nineteen participants were assigned to experimental conditions not reported in this paper. Data from four participants assigned to reported conditions were eliminated from the analysis. One of these four participants gave contradictory data (finding the auditor not responsible for the plaintiff's loss but making a monetary award to the plaintiff), while the other three (two attorneys and one CPA) reported professions that would prevent them from serving as jury members in an audit negligence case.

The main dependent measures are standard of care measures and evaluations of the auditor. Evaluations include ratings of the extent to which the auditor was "guilty" and "innocent" of negligence and verdicts in favor of or against the auditor.[3,4] Participants completed evaluations of the auditor and assessments of the auditor's monetary liability to the plaintiff, if applicable, immediately after hearing the case. They next performed a filler task and then answered a post-test questionnaire, which included a manipulation check for consequence severity and questions about their participation in the study. Finally, participants responded to standard of care and demographic items.

Consequence Severity

The consequences of audit failure were either moderate or severe. The two consequence levels arose from the same underlying events and auditor decisions. In both conditions, audit-client inventory was materially overstated due to fraud.[5] I manipulated consequence severity by varying the scope of the reported consequences. In the severe-consequences condition, late discovery of the overstatement resulted in large investor and creditor losses, failure of the client company, and loss of jobs for the company's employees. In the moderate-consequences condition, the same late discovery led to large creditor losses, but the client company was acquired by another firm and continued to operate. The larger scope of the more severe loss is irrelevant to the plaintiff's lawsuit because the losses were experienced by parties external to the suit (i.e., investors and employees). The experimental materials for the severe-consequences condition explained this to participants. The dollar amount of the plaintiff's loss was held constant across consequence descriptions to ensure that any observed effects are attributable to consequence severity, as defined above, rather than to the magnitude of the loss.

Audit Quality

I also manipulated audit quality at two levels. In the higher-audit-quality condition, the auditor consulted a specialist regarding inventory measurement. In the lower-audit-quality condition, the auditor did not consult a specialist. Consultation with a specialist is a stronger test of inventory quantities than estimation without a specialist's help, especially for the type of inventory described in the case (which was gravel stored in piles). Generally accepted auditing standards specifically mention, but do not require, consultation for this type of inventory (AICPA 1994). There were no other differences in audit procedures between the two levels of audit quality.

Buchman (1985, 269) notes that hindsight makes it easy to identify changes to an audit that would have facilitated discovery of misstatements. This is true even for audits of relatively high quality. Accordingly, experimental materials for both levels of audit quality

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[3] The instrument asked participants to rate how guilty and innocent the auditor was of negligence. Although the terms "guilty" and "innocent" would not be used in a civil case, I used these terms in the study to capture both positive and negative aspects of evaluations. Research in social psychology implies that positive (innocence) and negative (guilt) evaluations may be processed separately (Larsen and Ketelaar 1991, 133), and thus may be based on different types of evidence. For example, individuals might search for evidence of intent in assessing guilt, but be more interested in evidence of lack of causality in assessing innocence. In this study, guilt and innocence ratings were slightly super-additive when consequences were moderate and slightly sub-additive when consequences were severe, on average (see Table 3). Such noncomplementarity supports the contention that guilt and innocence ratings are based on different evidence.

[4] I elicited ratings because they allow more sensitive statistical tests than does the binary verdict variable.

[5] Inventory fraud is typical of important litigation cases against auditors. Management fraud is involved in about half of all litigation cases against auditors (Palmrose 1987, 98) and the most common type of management fraud is overvalued assets (Loebbecke et al. 1989, 11).

included expert witness testimony for the plaintiff claiming that other auditors in the defendant's position might have performed different or additional procedures. The materials mentioned performing tests at more inventory locations (since not all locations were tested) and giving the client less lead time regarding which locations would be tested. Consulting a specialist was also mentioned in the lower-audit-quality condition. In both audit-quality conditions, the expert witness for the defense argued that the defendant complied with auditing standards and performed the procedures that other auditors would have performed in the circumstances.

Standards of Care

In accordance with recommended psychometric practice, I used multiple measures to develop and assess standard of care dependent measures (Churchill 1979). Participants were expected to develop standards for the *type* and *extent* of work that an auditor must perform before making a judgment about the fairness of presentation of the financial statements, and for the degree of professional ***skepticism*** that auditors must maintain during an audit. Accordingly, I developed test items to measure the three standards of care (type, extent, and skepticism), as well as the extent to which auditors should serve as insurers against investor and creditor losses.[6] Most items were newly constructed, but five were adapted from Anderson et al. (1993). Next, two individuals with auditing experience reviewed each item to ensure that it addressed the construct of interest. I included the remaining items in a pilot test. Because reliability measures were within acceptable ranges for the pilot test (Cronbach's Alpha = 0.60), I included all items in the final instrument.

I used confirmatory factor analysis on data from the main study to construct standard of care dependent measures. The analysis confirmed that there were four important factors, and that the factors coincided with the three standards of care and the insurer role expectancy.[7] I computed the three standard of care dependent measures (type, extent, and skepticism) as equally weighted sums of responses to items with loadings of at least 0.5 on the relevant factor. Table 1 lists the items comprising each dependent measure.

IV. EMPIRICAL RESULTS

Manipulation Check for Severity of Consequences

The post-test questionnaire asked participants to choose the category that best described the consequences in the case they had read. Of five alternatives, three described neutral consequences, and two described losses of increasing severity accompanying a financial statement misstatement. Participants in the severe-consequences condition identified more

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[6] Beliefs about the extent to which auditors should serve as insurers against investor and creditor losses should not change with consequence severity. However, I measured these beliefs because they can affect the processing of audit-quality information. If jurors believe that auditors are always financially responsible for client losses, their verdicts will not be influenced by audit quality—as long as a loss occurs, such jurors will find auditors responsible for reimbursing plaintiffs. Participants with this extreme view would have an insurer role expectancy score of 40. The maximum observed score was 34, and the mean (standard deviation) of observed expectancies was 14.00 (8.20), indicating that participants did not hold this extreme view. Consistent with expectations, the dependent measure constructed for the insurer role expectancy (following the same method described for the standards of care) was not significantly affected by the experimental manipulations.

[7] I performed the factor analysis on data from the larger sample of 330 participants. A large sample size is required to ensure that factor results are reliable because of the large number of test items (Nunnally and Bernstein 1994, 534).

TABLE 1
Standard of Care Survey Items[a]

Panel A: Type-of-Work Items

** T1. Auditors should always create and perform special tests designed to discover fraud, even if the company's owners and managers seem to be honest.

** T2. In the performance of an audit, it is the auditor's responsibility to actively search for instances of fraud in financial reporting, no matter how small.

***T3. Auditors should always perform a complete review of the client's accounting system and of the controls over the system, even if they can verify the numbers on the financial statements without doing so.

* T4. Auditors must examine all aspects of a company's financial health in order to properly do their jobs.

** T5. Auditors should gather all of the evidence that they can possibly get before drawing any conclusions about the financial statements.

Panel B: Extent-of-Work Items

E1. Auditors can tell a lot about a company's financial records by inspecting only a few documents if those few documents are selected carefully.

E2. Auditors cannot examine every client transaction. They must rely on samples and tests of relationships in conducting an audit.

E3. When a client stores inventory in several different places, auditors cannot and do not need to observe inventory at every site.

E4. Auditors must make their decisions after inspecting only a small sample of the documents that are available because this is more efficient than looking at every document.

E5. By planning carefully and using sophisticated techniques for choosing which documents to examine, auditors are able to reduce the number of tests that they do without sacrificing quality of their work.

* E6. If auditors always required only the strongest type of evidence, audits would be too expensive.

E7. Auditors cannot always use the strongest tests; they need to balance the strength of the tests with the cost and convenience of the tests.

E8. Auditors cannot be expected to discover small misstatements in financial statements, because the level of detail of their tests has to be limited.

Panel C: Professional-Skepticism Items

** S1. Auditors should be completely independent of their clients, so they should not accommodate their clients' wishes in designing their tests.

** S2. Auditors should be completely objective and unaffected by their clients' wishes.

***S3. Auditors work for the companies whose financial statements they audit, so they have to allow their clients some latitude in what they report.

S4. Even though auditors are hired by and paid by their clients, their responsibility is to the public; they should try to put the public's interests before the client's in designing their audits.

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*, **, *** indicate a higher standard of care for the severe- vs. moderate-consequences condition (one-tailed test) at the 0.10, 0.05 and 0.01 level, respectively.

[a] Participants indicated the extent to which they agreed with each item on a 0 (completely disagree) to 10 (completely agree) scale. Each panel contains a subset of items chosen from a larger set using confirmatory factor analysis. Cronbach's Alpha is 0.67, 0.78, and 0.60 for the type-of-work, extent-of-work, and professional-skepticism subsets, respectively.

severe outcomes as consistent with the case they read (collapsing across the neutral-consequence choices, $X^2_2 = 59.04$, $p < 0.001$), indicating that the consequence-severity manipulation was effective.[8]

Tests of Hypothesis 1: Standards of Care

To analyze the first hypothesis, I use the dependent measures constructed using confirmatory factor analysis as described above. Hypothesis 1 predicts that standards of care are higher when the consequences of audit failure are severe. Recall that there are three dimensions to the standard of care: type of work, extent of work, and level of professional skepticism. Table 1 shows that the type-of-work standard assesses the extent to which auditors should actively search for fraud and evaluate the company's financial health in addition to performing more "normal" audit duties. The extent-of-work standard focuses on the appropriateness of testing on a sample basis. Professional skepticism refers to the importance of independence from the client and the client's demands, and duty to the public over duty to the client.

Table 2 provides means and standard deviations for each standard of care for the two levels of consequence severity. Both the type-of-work and professional-skepticism standards are higher for severe vs. moderate consequences ($t_{104} = 3.27$, $p < 0.001$ for type; t_{104}

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[8] The neutral consequences were: (1) that the participants did not learn whether the financial statements were misstated; (2) that the financial statements were not misstated; and (3) that the financial statements were misstated, but with no financial consequences for the plaintiff. Overall, 80 percent of the participants identified the consequence description that most closely matched the case they had read. When data from the participants who did not correctly identify their condition are omitted from the analysis, inferences about the hypotheses are identical to the reported results except as otherwise noted.

TABLE 2
Standard of Care Assessments by Consequence Severity[a]

	Moderate Consequences[b]	*Severe Consequences*[b]
Type of Work	32.47 (9.42) n = 52	37.84*** (7.39) n = 54
Extent of Work	33.20 (14.49) n = 52	32.72 (14.66) n = 53
Professional Skepticism	19.25 (7.39) n = 53	22.93*** (6.27) n = 53

*** indicates a higher standard of care (one-tailed test) for the severe vs. moderate consequences condition at the 0.01 level.

[a] Table values are the mean (standard deviation) of standard of care measures constructed as equally weighted linear combinations of participants' responses to items in each panel of Table 1. All items are scored such that higher scores reflect higher standards of care.

[b] In the moderate-consequences condition, the creditor suffered large financial losses when the fraud was discovered. In the severe-consequences condition, the creditor suffered the same losses, but, in addition, the company failed, employees lost their jobs, and stockholders incurred large losses. The differences in conditions are legally irrelevant because the additional losses in the severe-consequences condition were borne by parties external to the lawsuit described in the experimental materials.

$= 2.76$, $p = 0.003$ for skepticism).[9] However, the extent-of-work standard did not differ between the two consequences conditions ($t_{103} = -0.17$, $p = 0.568$).[10] Consistent with H1, severe outcomes highlight the importance of auditor independence and searching for fraud. Participants assessed higher standards for these aspects of auditor work when consequences were severe.[11]

Evidence that the extent-of-work standard did not vary with consequence severity is surprising. In all experimental conditions, the auditor observed inventory at only a sample of locations, and this decision allowed the fraud to remain undetected. I expected that severe consequences would highlight the importance of exhaustive testing, causing participants to have less favorable views toward sampling; however, this did not occur.

Additional Analysis: Standards of Care

Results of tests of H1 indicate that the type-of-work and professional-skepticism standards of care increased with consequence severity. This phenomenon may be attributable to severe consequences motivating participants to lay blame. In other words, omitted procedures may have become more salient to participants when the consequences of audit failure were severe *because* they wanted to assign blame and they could do so if they increased standards of care sufficiently.[12]

To test for this "blame-laying" mechanism, the post-test questionnaire asked participants how important it was to "figure out who was to blame for the events described in the case." Participants in the severe-consequences condition reported higher motivation to lay blame than did participants in the moderate-consequences condition (means [standard deviations] were 7.65 [2.07] for severe consequences and 6.80 [2.02] for moderate consequences, $t_{105} = 2.14$, $p = 0.017$). This suggests that the increase in standards of care may be even more troublesome than is implied by the H1 result. If severe consequences motivate jurors to lay blame, standards of care may increase beyond the level of care provided, even if that level is extremely high.

Tests of Hypothesis 2: Evaluations

Hypothesis 2 predicts an ordinal interaction between audit quality and consequence severity. Specifically, I expect juror evaluations to be more positive for higher quality audits than for lower quality audits when consequences are moderate. However, I expect juror evaluations of auditors to be low and insensitive to audit quality when consequences are severe. I use three types of evaluations (guilt ratings, innocence ratings, and verdicts) to test this hypothesis. Table 3, Panel A provides means and standard deviations for guilt and innocence ratings by consequence severity and audit quality. Planned contrasts for guilt and innocence ratings appear in Panels B and C, respectively.

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[9] Several participants failed to answer one or more questions. Each analysis includes the maximum number of usable responses.

[10] The theory predicts that severity of consequences will increase standards of care, but provides no expectation that audit quality or the interaction of audit quality and consequence severity will affect the standards. ANOVA models for the standards of care confirm that the main effect of consequence severity is the only significant effect for the type-of-work and professional-skepticism standards. No effects are significant for the extent-of-work standard.

[11] The increase in standards of care was not limited to specific issues raised in the case. For example, univariate tests of the effect of consequence severity on each component of the standards of care (Table 1) reveal that in light of severe consequences, participants had higher expectations regarding the extent to which auditors should search for fraud (T1, T2); however, they also expected auditors to perform a more complete review of the accounting system and internal controls (T3) and allow clients less latitude in reporting (S3). The experimental materials did not mention either internal controls or reporting issues.

[12] Fincham (1982) provides evidence consistent with the assertion that severe consequences cause higher motivation to lay blame. Fincham (1982) found that individuals provided with one cause of an intentional act of aggression were more likely to infer a second cause when consequences were severe, particularly if the provided cause was external. External causes, such as being provoked, do not allow unambiguous attribution of blame to the aggressor, while internal causes, such as being in a bad mood, do. Thus, when severe consequences occurred, participants inferred additional causes that allowed them to unambiguously assign blame to the aggressor.

The first contrast reported in Panel B of Table 3 is a comprehensive test of the predicted pattern described above. The planned contrast shows that guilt ratings were lowest when consequences were moderate and audit quality was higher, and higher in the other three

TABLE 3

Guilt and Innocence Ratings by Consequence Severity and Audit Quality

Panel A: Mean (Standard Deviation of) Ratings

	Moderate Consequences[a]	*Severe Consequences*[a]
Guilt[b]		
Lower Audit Quality[c]	5.00 (2.69) n = 26	5.26 (2.85) n = 27
Higher Audit Quality[c]	3.83 (3.21) n = 24	5.35 (3.15) n = 26
Innocence[d]		
Lower Audit Quality[c]	5.59 (2.48) n = 27	4.61 (2.82) n = 27
Higher Audit Quality[c]	6.74 (2.62) n = 25	4.46 (2.65) n = 27

Panel B: Planned Contrasts for Guilt Ratings

Contrast	*t-statistic*	*df*	*p-value*[e]
H2: Higher-audit-quality, moderate-consequences cell lowest	1.97	99	0.026
H2a: Lower vs. higher audit quality for moderate consequences	1.39	99	0.085
H2b: Lower vs. higher audit quality for severe consequences	−0.10	99	0.542

Panel C: Planned Contrasts for Innocence Ratings

Contrast	*t-statistic*	*df*	*p-value*[e]
H2: Higher-audit-quality, moderate-consequences cell highest	3.06	102	0.001
H2a: Higher vs. lower audit quality for moderate consequences	1.56	102	0.061
H2b: Higher vs. lower audit quality for severe consequences	−0.20	102	0.581

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[a] Table 2 describes the moderate- and severe-consequences conditions.

[b] The dependent measure is the participant's response on a 0–10 scale to "*How guilty* of negligence do you believe [the auditor] is?"

[c] In the higher-audit-quality condition auditors performed a procedure that generally accepted auditing standards specifically recommend, but do not require. In the lower-audit-quality condition, auditors did not perform this procedure.

[d] The dependent measure is the participant's response on a 0–10 scale to "*How innocent* of negligence do you believe [the auditor] is?"

[e] p-values are one-sided.

conditions ($t_{99} = 1.97$, $p = 0.026$).[13] Additional tests reveal that when consequences were moderate (H2a), guilt ratings were lower for higher quality audits than for lower quality audits ($t_{99} = 1.39$, $p = 0.085$). When consequences were severe (H2b), however, guilt ratings were not influenced by audit quality ($t_{99} = -0.10$, $p = 0.542$).

Similarly, results for innocence ratings support the hypothesis. Panel C of Table 3 demonstrates that innocence ratings were highest when consequences were moderate and audit quality was higher ($t_{102} = 3.06$, $p = 0.001$). Further, when consequences were moderate (H2a), innocence ratings were higher for higher quality audits than for lower quality audits ($t_{102} = 1.56$, $p = 0.061$), but innocence ratings were not influenced by audit quality when consequences were severe ($t_{102} = -0.20$, $p = 0.581$). Thus, participants evaluated auditors who performed higher quality audits more favorably only when the consequences of audit failure were not severe.

I also use contrasts to test my hypothesis for verdicts. Results are comparable to those for ratings. Panel A of Table 4 reports the proportion and percentage of verdicts against the auditor by experimental condition, and Panel B reports tests of H2. When consequences were moderate and audit quality was higher, 38 percent of the participants chose verdicts

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[13] I assigned contrast weights for the guilt dependent measure as follows: −3 for the moderate-consequences, higher-audit-quality cell, and +1 for the other three cells (as in Buckless and Ravenscroft 1990, 939). Weights for the innocence dependent measure were +3 for the moderate-consequences, higher-audit-quality cell, and −1 for the other three cells. This contrast is a stringent test in that it assumes responses in the two severe-consequences cells are equal to those in the moderate-consequences, lower-audit-quality condition, which is not strictly necessary for support of the hypothesis. If I relax the assumption that the moderate-consequences, lower-audit-quality cell is equivalent to the two severe-consequences cells, then the relevant comparison is that the moderate-consequences, higher-audit-quality cell is different from the two severe-consequences cells (i.e., contrast weights for guilt (innocence) ratings are −2 (+2) for the moderate-consequences, higher-audit-quality cell, 0 for the moderate-consequences, lower-audit-quality cell, and +1 (−1) for the other cells). The data also support this less stringent contrast ($t_{99} = 2.01$, $p = 0.024$ for guilt, $t_{102} = 3.44$, $p < 0.001$ for innocence).

TABLE 4
Verdicts against Auditor by Consequence Severity and Audit Quality

Panel A: Proportion (Percentage) of Verdicts against Auditor

	Moderate Consequences[a]	*Severe Consequences*[a]
Lower Audit Quality[b]	16/27 (59.25)	19/27 (70.37)
Higher Audit Quality[b]	10/26 (38.46)	15/27 (55.56)

Panel B: Planned Contrasts for Verdicts

Contrast	*p-value from Fisher's Exact Test*[c]
H2: Higher-audit-quality, moderate-consequences cell lowest	.032
H2a: Lower vs. higher audit quality for moderate consequences	.107[d]
H2b: Lower vs. higher audit quality for severe consequences	.199[d]

[a] Table 2 describes consequence-severity conditions.

[b] Table 3 describes audit-quality conditions.

[c] p-values are one-sided.

[d] Omitting the data from the 21 participants who did not correctly identify their consequence condition changes the p-values to 0.043 for H2a and 0.274 for H2b.

against the auditor. This is significantly less than the 62 percent of participants who chose verdicts against the auditor in the other three conditions, aggregated (Fisher's Exact Test, $p = 0.032$).[14] Additional tests reveal that when consequences were moderate (H2a), audit quality marginally influenced verdict choice (38 percent against the auditor for higher audit quality vs. 59 percent for lower audit quality, $p = 0.107$). When consequences were severe, however, audit quality did not affect verdicts (70 percent against the auditor for higher audit quality vs. 56 percent for lower audit quality, $p = 0.199$). When I omit data from participants who did not correctly identify their consequence-severity condition, the differential reliance on audit-quality information across the two levels of consequence severity is more striking. For moderate consequences, 71 percent of the participants chose verdicts against the auditor when audit quality was lower, while only 40 percent found against the auditor when audit quality was higher. This difference is significant ($p = 0.043$). When consequences were severe, 71 percent chose verdicts against the auditor when audit quality was lower, compared with 58 percent when audit quality was higher. As expected, these percentages are not significantly different ($p = 0.274$). Auditors were rewarded for higher-audit quality, but only when consequences were moderate.[15]

V. SUMMARY AND CONCLUSIONS

In this study I investigate whether standards of care for auditors depend on the severity of the consequences of audit failure. Prior research assumes that standards of care are determined *ex ante*, and that auditors can improve their chances of meeting or exceeding such standards by performing higher quality audits. In this study, participants evaluating an auditor involved in an audit failure with severe adverse consequences set higher standards of care for the type of work that auditors should do and the level of professional skepticism that they should maintain than did participants evaluating an auditor involved in an audit failure with moderate consequences.

If standards of care depend on the *ex post* consequences of audit failure, auditors may be unable to meet the higher standards that arise when consequences are severe, even by performing higher quality audits. This is consistent with my evidence that participants evaluated auditors more positively when the auditor performed a higher quality audit only when the consequences of audit failure were moderate. When the consequences of audit failure were severe, participants evaluated auditors as if they did not consider audit quality.

Additional analysis suggests that the effect of consequence severity on standards of care likely arose because participants were more motivated to lay blame when the consequences of audit failure were severe. If jurors are highly motivated to lay blame, auditors may be unable to improve their evaluations when severe consequences occur, even by providing audits of extremely high quality. Future research could further investigate the importance of the blame-laying mechanism by determining whether the results hold in conditions with extremely high audit quality.

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[14] This contrast is analogous to that reported in footnote 13 for ratings, and thus may be overly restrictive. If I relax the requirement that the moderate-consequences, lower-audit-quality cell is equivalent to the two severe-consequences cells, then the relevant comparison is that the moderate-consequences, higher-audit-quality cell is different from the two severe-consequences cells ($34/54 = 63$ percent), and the contrast remains significant ($p = 0.034$).

[15] The juror's task can be seen as having three components: assessing standards of care, assessing audit quality, and comparing the two. Severe consequences could have caused the effects observed in tests of H2 by increasing standards of care (as in H1), reducing perceptions of audit quality, or both. I did not measure perceived audit quality, and so cannot disentangle the two effects. However, the fact that higher standards of care were observed for more severe consequences suggests that higher standards of care are at least partly responsible for the observed effects. Regardless of the mechanism, the results demonstrate that severe consequences, though legally irrelevant, caused participants to evaluate auditors as if they did not consider audit quality.

Future research could extend this study by incorporating additional factors expected to affect juror evaluations of auditors. Such variables might include the source of professional standards (e.g., government vs. the profession [Buckless and Peace 1993]), the reputation of the auditor, whether the misstatement is caused by auditor error or client fraud, and, if by fraud, the type of fraud (Bonner et al. 1998).

The determinants of standards of care may be another fruitful area for future research. At present, we know very little about the formation of standards of care. This study used psychometric methods to develop standard of care measures, and shows that standards of care depend on legally irrelevant information. Future work could provide a more detailed investigation of the factors that are important in determining each standard of care.

Finally, future work could investigate determinants of jury award amounts. It is likely that once a juror has determined that an auditor is financially responsible for a plaintiff's loss, the juror will use a second set of factors to determine the amount of the liability. These factors likely overlap with those used to evaluate responsibility, but the two sets may not be coincident. For example, the dollar value of the plaintiff's loss (independent of consequence severity), the auditor's ability to pay, and the availability of additional solvent defendants in the suit would likely affect award amounts, but not evaluations.

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BOOK REVIEWS

Jane L. Reimers, Editor

Editor's Note: This issue continues a series of invited book reviews by leading scholars in accounting. They have been invited to select a work that has influenced the development of their academic careers and to provide a brief review of that book or monograph. This issue features the reviews of William R. Kinney, Jr. and Katherine Schipper. Like all of the scholars who have agreed to participate in this series, Bill and Katherine have made significant and outstanding contributions to every aspect of our profession—teaching, research, and service. Special thanks to both of them for these excellent reviews.

JOEL S. DEMSKI, *Information Analysis* (Reading, MA: Addison-Wesley Publishing Company, 1972 [2nd edition 1980], pp. 144, $17.00).

In a prior book review in this series, Joel Demski expressed his appreciation for Gerard Debreu's 1959 monograph and its impact on his thinking and his career. Here, I do the same for Joel's 1972 monograph built on the work of Debreu and others in statistical decision theory and information economics.

Information Analysis reviews basic decision theory and treats information as an economic good. Joel begins with definitions of alternative actions, states, probabilities of states, and utility conditional on state-action outcomes, and focuses on information systems that yield signals about the probabilities of possible states. In contrast to most accounting authors of the day, he formalized the costs and benefits of an information system, explicitly recognizing that information acquisition entails costs and benefits that must be assessed to make appropriate acquisition decisions.

Joel separates decision making into information evaluation (choosing an information system to produce signals about state probabilities) and action choice using the resulting signals. This separation formalizes decision-theoretic roles for accounting signal realizations, accounting systems that produce signals (e.g., GAAP), and accountants themselves. Accounting scholars can then use decision theory and related concepts such as game theory to address accounting systems choice problems.

In three short chapters Demski reviews essentials of the economics of information and information systems, the nature of complete and simplified decision analysis, and the resulting roles of information. In a complete analysis, the only role for information is state probability revision, whereas in a simplified analysis the signal may also imply that the simplified decision model itself should be rejected. For example, disclosure of exceptional risk might cause an investor to reject a simplified GAAP-based valuation model. A more complete analysis based on a risk profile to reinterpret GAAP-based measurements may justify its added cost for some investments, but the simplified analysis will be economical for others. Systematic provision for such disclosures can add to the value of a GAAP-based system.

Three additional chapters apply information analysis to models of capital acquisition, short-run output, and control, paralleling major functions of financial and managerial accountants. Demski closes with a formal analysis of information systems choice from the perspective of the information evaluator. The latter imbeds the decision maker's action choice problem into the information evaluator's information system acquisition problem. This brings into sharp relief how a self-interested information evaluator would be expected to behave and the need to address implications of that behavior in information system acquisition design. For example, one can see the economic demand for professional standards and codes of professional conduct.

I first taught auditing in the spring of 1972. It was frustrating. Students continually asked what is the "right" sample size, or "how much auditing is enough?" I could answer only "see what they did last year," or "your supervisor will know." Later that year, Elliott and Rogers' *Journal of Accountancy* article and SAP No. 54 gave partial answers by exogenous imposition of materiality and audit risk constraints. After Demski's *Information Analysis*, a more complete answer was possible. Each sample size or amount of auditing is itself an information system that will yield various possible signals about state probabilities. The "right" sample size or how much auditing is enough is not imposed exogenously by the staff auditor's supervisor or by auditing standards. Rather it is endogenous to a completely specified decision-theoretic problem representation. To me, it was an epiphany.

Demski's *Information Analysis* affected my teaching and research immediately, and its influence has continued throughout the ensuing decades. It has allowed me to think about accounting standards choice across an economy with a sense of perspective (even awe). Its influence on practice today can be seen in the AICPA's formulation of assurance services that "improve the quality of information, or its context, for decision makers."

Through this brief and efficiently presented monograph (even the two-word title conveys its essence), Demski provided a framework within which to understand accounting information choice problems, and to pursue their solutions using a variety of research methods. The common language of information analysis then allowed efficient and effective communication of results across research methods and application contexts.

WILLIAM R. KINNEY, JR.
Professor

University of Texas at Austin

REED K. STOREY AND SYLVIA STOREY, *The Framework of Financial Accounting Concepts and Standards* (Norwalk, CT: Financial Accounting Standards Board, 1998, pp. 170, $12.75).

This monograph provides a compelling introduction to the Conceptual Framework of the Financial Accounting Standards Board.[1] In particular, it facilitates understanding the current structure of U.S. GAAP by explaining why the Board undertook development of the Conceptual Framework (that is, what were the problems the Framework was intended to address) and why the Board decided to define other financial statement elements in terms of assets and liabilities.

The first half the monograph provides history and background and summarizes several failed attempts to develop fundamental accounting "principles" or "theory" that would then guide practice and later standard setting. The history begins with the use of the word *principle* in financial accounting (in the 1930s, in connection with attempts by the NYSE and the predecessor organization to the AICPA to improve financial accounting practices). It continues with explanations of conceptual controversies that led to the demise of the Committee on Accounting Procedure and the Accounting Principles Board. These explanations make it clear that these standard-setting organizations failed, at least partly and perhaps entirely, because they had no solid conceptual basis for choosing among accounting alternatives.

The authors thoroughly discuss the development and widespread acceptance of the "matching principle," the idea that accounting standards should be based on matching costs with revenues so as to determine periodic net income in a way that produces a "representative" or "undistorted" income number. This discussion dissects the superficial appeal of the matching principle and, by referring directly to the difficulties the FASB encountered in its research and development (1974; SFAS No. 2) and contingencies (1975; SFAS No. 5) projects, lays bare the difficulties inherent in attempts to set accounting standards using this principle.

The second half of the monograph introduces and explains many of the concepts in the Conceptual Framework. In the discussion of assets and liabilities, the authors revisit the matching principle (here termed the revenue and expense view) and contrast it with a framework that accords conceptual primacy to assets and liabilities.[2] They cite examples, from the 1990s, of sharp disagreements between the FASB and some of its constituencies who adhere to a revenue-and-expense or matching view of financial reporting. These examples, often supported with quotations and references, are useful in clarifying both the distinctions between the revenue-and-expense view and the asset-and-liability view and the conceptual and practical advantages of the latter.

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[1] As the monograph notes, the Conceptuaal Framework is incomplete; the Board periodically considers the development of new concepts statements, most recently on using discounted cash flows to measure assets and liabilities.

[2] Conceptual primacy refers to definitional dependency. It means that some elements are defined in terms of others. For example, revenues are defined in terms of assets, so assets have conceptual primacy.

The authors describe Concepts Statements 1–6, devoting the most detailed discussions to Statement 2 (*Qualitative Characteristics of Accounting Information*), Statement 5 (*Recognition and Measurement in Financial Statements of Business Enterprises*), and Statement 6 (*Elements of Financial Statements*). They explain the purpose of each Concepts Statement, they describe and discuss some key elements of each Statement, and they develop links between the ideas in the Statements and earlier discussions in the monograph. In some cases, the ideas in the Concepts Statements are also linked to standards adopted by the Board and to criticisms, from within and outside the Board, of the ideas in the Statements. The discussion of comprehensive income is of particular interest in light of the recent issuance of SFAS No. 130 and ongoing discussions about what elements should be included in, and excluded from, income or earnings.[3]

This monograph is particularly relevant to those with research interests in accounting theory or in contemporary financial reporting issues including, for example, what if anything should be done about the accounting for intangibles, and the accounting for contracts in general and leases in particular. It is also highly relevant to those who teach accounting theory or financial reporting of any sort. The exposure of the matching principle to rigorous analysis, alone, justifies the effort to read and understand the authors' arguments. This is not to say that the monograph is difficult to read; one of its strengths is that it is exceptionally clearly and engagingly written, and arguments are generously supported with examples, quotations, and references—in short, if a monograph on conceptual frameworks for financial reporting can ever be called "a fascinating read," this one is. Its substantive appeal, and the reason it will influence the thinking of those who read it, derives from the compelling discussions of why conceptual frameworks are crucial for standard setting and why the FASB adopted the assets and liabilities perspective—and rejected the matching principle—in establishing its conceptual framework.

KATHERINE SCHIPPER
Professor

Duke University

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[3] Those interested in this issue may also wish to read *Reporting Financial Performance: Current Developments and Future Directions*, L. Tood Johnson and Andrew Lennard, a special report of thet FASB in conjunction with the G4+1 standard setters and *Reporting Financial Performance: A Proposed Approach*, Kathryn Cearns, also a special report of the FASB in conjunction with the G4+1.

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Manuscripts submitted to *The Accounting Review* are assigned one or two reviewers. The following table contains information about turnaround time for reviewed manuscripts for the 12-month period ended February 29, 2000. Turnaround time is the number of days between the date that the manuscript and submission fee were received and the date of the editor's letter to the author(s).

	Number of Manuscripts	Cumulative Number	Cumulative Percent
0 ≤ Days ≤ 30	30	30	14.35
31 ≤ Days ≤ 60	88	118	56.46
61 ≤ Days ≤ 90	68	186	89.00
91 ≤ Days ≤ 120	17	203	97.13
≤ 121 Days	6	209	100.00

The mean review time was 57 days; the median review time was 55 days. A limited number of manuscripts are returned without review and such manuscripts are excluded from the turnaround time statistics reported above.

EDITORIAL POLICY AND STYLE INFORMATION

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According to the policies set by the Publications Committee (which were endorsed by the Executive Committee and were published in the *Accounting Education News*, June 1987), *The Accounting Review* "should be viewed as the premier journal for publishing articles reporting the results of accounting research and explaining and illustrating related research methodology. The scope of acceptable articles should embrace any research methodology and any accounting-related subject, as long as the articles meet the standards established for publication in the journal....No special sections should be necessary. The primary, but not exclusive, audience should be—as it is now—academicians, graduate students, and others interested in accounting research."

The primary criterion for publication in *The Accounting Review* is the significance of the contribution an article makes to the literature.

The efficiency and effectiveness of the editorial review process is critically dependent upon the actions of both authors submitting papers and the reviewers. Authors accept the responsibility of preparing research papers at a level suitable for evaluation by independent reviewers. Such preparation, therefore, should include subjecting the manuscript to critique by colleagues and others and revising it accordingly prior to submission. The review process is not to be used as a means of obtaining feedback at early stages of developing the research.

Reviewers and associate editors are responsible for providing critically constructive and prompt evaluations of submitted research papers based on the significance of their contribution and on the rigor of analysis and presentation. Associate editors also make editorial recommendations to the editor.

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The Accounting Review's manuscript preparation guidelines follow (with a sight modification) the B-format of *The Chicago Manual of Style* (14th ed.; University of Chicago Press). Another helpful guide to usage and style is *The Elements of Style*, by William Strunk, Jr., and E. B. White (Macmillan). Spelling follows *Webster's International Dictionary.*

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1. All manuscripts should be typed in 12-point font on one side of 8½ × 11" good quality paper and be double spaced, except for indented quotations.
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3. Margins of at least one inch from top, bottom, and sides should facilitate editing and duplication.
4. To promote anonymous review, authors should not identify themselves directly or indirectly in their papers or in experimental test instruments included with the submission. Single authors should not use the editorial "we."
5. A cover page should show the title of the paper, the author's name, title and affiliation, email address, any acknowledgments, and a footnote indicating whether the author would be willing to share the data (see last paragraph in this statement).

Pagination: All pages, including tables, appendices and references, should be serially numbered. Major sections should be numbered in Roman numerals. Subsections should not be numbered.

Numbers: Spell out numbers from one to ten, except when used in tables and lists, and when used with mathematical, statistical, scientific, or technical units and quantities, such as distances, weights and measures. For example: *three days; 3 kilometers; 30 years*. All other numbers are expressed numerically.

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American Accounting Association, Committee on Concepts and Standards for External Financial Reports. 1977. *Statement on Accounting Theory and Theory Acceptance.* Sarasota, FL: AAA.

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Dye, R., B. Balachandran, and R. Magee. 1989. Contingent fees for audit firms. Working paper, Northwestern University, Evanston, IL.

Fabozzi, F., and I. Pollack, eds. 1987. *The Handbook of Fixed Income Securities*. 2nd edition. Homewood, IL: Dow Jones-Irwin.

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Porcano, T. M. 1984a. Distributive justice and tax policy. *The Accounting Review* 59 (October): 619–636.

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Shaw, W. H. 1985. Empirical evidence on the market impact of the safe harbor leasing law. Ph.D. dissertation, University of Texas at Austin.

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University of Delaware
Newark, DE 19716
Phone: (302) 831-1793
Fax: (302) 831-4676
Email: stpierrk@be.udel.edu

Midwest Region
Bill Cummings
Department of Accountancy
Northern Illinois University
DeKalb, IL 60115-2854
Phone: (815) 753-6098
Fax: (815) 753-8515
Email: wcumming@niu.edu

N. Allen Ford
Division of Accounting and Information Systems
School of Business
University of Kansas
Lawrence, KS 66045-2003
Phone: (913) 864-7523
Fax: (913) 864-5328
Email: aford@bschool.wpo.ukans.edu

Northeast Region
Priscilla A. Burnaby
Department of Accountancy
AGC214
Bentley College
175 Forest Street
Waltham, MA 02154-4705
Phone: (617) 891-2519
Fax: (617) 891-2896
Email: pburnaby@bentley.edu

Bruce L. Oliver
Accounting Program
College of Business
Rochester Institute of Technology
108 Lomb Memorial Drive
Rochester, NY 14623-0887
Phone: (716) 475-6668
Fax: (716) 475-6920
Email: blobbu@rit.edu

Ohio Region
Susan Lightle
Department of Accountancy
College of Business
Wright State University
Dayton, OH 45435-0001
Phone: (937) 775-2377
Fax: (937) 775-2310
Email:slightle@wright.edu

Southeast Region
Ralph Byington
Department of Accounting
Georgia Southern University
Statesboro, GA 30460-8141
Phone: (912) 681-5678
Fax: (912) 681-0105
Email: byington@gsvms2.cc.gasou.edu

John McAllister
Department of Accounting
Kennesaw State University
1000 Chastain Road
Kennesaw, GA 30144-5591
Phone: (770) 423-6084
Fax: (770) 499-3420
Email: jmcallis@ksumail.kennesaw.edu

Southwest Region
Jep Robertson
Department of Accounting and Business Computer Systems
College of Bus. Admin. & Economics
Box 30001/Department 3DH
New Mexico State University
Las Cruces, NM 88003-8001
Phone: (505) 646-1520
Fax: (505) 646-1552
Email: proberts@nmsu.edu

Western Region
John E. Karayan
Department of Accounting
School of Business Administration
California State Polytechnic University, Pomona
Pomona, CA 91768
Phone: (909) 869-2367
Fax: (909) 869-4353
Email: jekarayan@csupomona.edu

Kevin H. McBeth
School of Accountancy
Goddard School of Business and Economics
Weber State University
3803 University Circle
Ogden, UT 84408-3803
Phone: (801) 626-6989
Fax: (801) 626-7423
Email: kmcbeth@weber.edu

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Weatherhead School of Management
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10900 Euclid Avenue
Cleveland, OH 44106
Phone: (216) 368-3938
Fax: (216) 368-4776
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A. J. Palumbo School of Business Administration
Rockwell Hall, Room 820
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Phone: (412) 396-6274
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Department of Accounting
School of Management
Suffolk University
Boston, MA 02108-2770
Phone: (617) 573-8394
Fax: (617) 573-8345
Email: lpant@suffolk.edu

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A. J. Palumbo School of Business Administration
Rockwell Hall, Room 820
Duquesne University
Pittsburgh, PA 15282-0180
Phone: (412) 396-6274
Fax: (412) 396-4764
Email: sisaye@duq2.cc.duq.edu

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Department of Accounting and Business Law
College of Business Administration
The University of Tennessee
Knoxville, TN 37996-0560
Phone: (423) 974-1758
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James A. Heintz
Div. of Accounting & Info. Sys.
School of Business
University of Kansas
Lawrence, KS 66045-2003
Phone: (785) 864-4568
Fax: (785) 864-5328
Email: jheintz@ukans.edu

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School of Accountancy
College of Business Administration
University of South Florida
Tampa, FL 33620-5500
Phone: (813) 974-6516
Fax: (813) 974-6528
Email: rkeith@bsn01.bsn.usf.edu

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Kenneth A. Merchant
Levanthal School of Accounting
University of Southern California
3660 Trousdale Parkway
Los Angeles, CA 90089-1421
Phone: (213) 740-4841
Fax: (213) 747-2815
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Department of Accountancy
College of Business
Northern Kentucky University
Highland Heights, KY 41099-0502
Phone: (606) 572-6526
Fax: (606) 572-6177
Email: marquis@nku.edu

American Taxation Association

President
Robert L. Gardner
School of Accountancy and Information Systems
Marriott School of Management
Brigham Young University
Provo, UT 84602
Phone: (801) 378-3212
Fax: (801) 378-5933
Email: gardner@byu.edu

President-Elect
Shirley Dennis-Escoffier
Department of Accounting
317 Jenkins Building, School of Business
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Coral Gables, FL 33146-6531
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School of Business Administration
Portland State University
Portland, OR 97207
Phone: (503) 725-3798
Fax: (503) 725-4882
Email: annec@sba.pdx.edu

Vice President-Elect
Jeff Gramlich
College of Business Administration
University of Hawaii
2404 Maile Way
Honolulu, HI 96822
Phone: (808) 956-8063
Fax: (808) 956-9888
Email: gramlich@hawaii.edu

Secretary
Mark Higgins
Department of Accounting
College of Business
University of Rhode Island
Kingston, RI 02881
Phone: (401) 792-4244
Fax: (401) 792-4312
Email: mhiggins@uriacc.uri.edu

Treasurer
Roby Sawyers
Department of Accounting
College of Management
North Carolina State University
Hillsborough Street
Raleigh, NC 27695-8113
Phone: (919) 515-4443
Fax: (919) 515-4446
Email: roby_sawyers@ncsu.edu

Artificial Intelligence/Emerging Technologies Section

Chairperson
Alan Sangster
The Open University Business School
The Briggs Building
Walton Hall
Milton Keynes MK7 6AA
UNITED KINGDOM
Phone: +44 1908 655856
Fax: +44 1908 655898
Email: a.sangster@open.ac.uk

Chairperson-Elect
Marilyn Greenstein
College of Business and Economics
Lehigh University
RBC 37
Bethlehem, PA 18015
Phone: (610) 758-3457
Fax: (610) 758-4499
Email: mmg0@lehigh.edu

Secretary/Treasurer
James A. Hall
College of Business and Economics
Lehigh University
RBC 37
Bethlehem, PA 18015
Phone: (610) 758-4446
Fax: (610) 758-6429
Email: jah0@lehigh.edu

Council Representative
Alan Sangster
The Open University Business School
The Briggs Building
Walton Hall
Milton Keynes MK7 6AA
UNITED KINGDOM
Phone: +44 1908 655856
Fax: +44 1908 655898
Email: a.sangster@open.ac.uk

Auditing

President
Karen Pincus
Department of Accounting
Sam M. Walton College of Business Administration
University of Arkansas
Fayetteville, AR 72701
Phone: (501) 575-6119
Fax: (501) 575-4168
Email: kpincus@comp.uark.edu

Past President
Timothy B. Bell
KPMG
Three Chestnut Ridge Road
Montvale, NJ 07645
Phone: (201) 307-7321
Fax: (201) 505-6210
Email: tbell@kpmg.com

Vice President–Academics
Stan Biggs
Department of Accounting U-41A
School of Business Administration
University of Connecticut
Storrs, CT 06269-2041
Phone: (860) 486-2374
Fax: (860) 486-4838
Email: stan@sba.uconn.edu

Vice President–Practice
Jerry D. Sullivan
Public Oversight Board
One Station Place
Stamford, CT 06902
Phone: (203) 353-5304
Fax: (203) 353-5311
Email: jdsullivan@woldnet.att.net

Treasurer
Mark Beasley
Department of Accounting
College of Management
University of North Carolina
Raleigh, NC 27695-8113
Phone: (919) 515-6064
Fax: (919) 515-4443
Email: mark_beasley@ncsu.edu

Secretary
Jean C. Bedard
Accounting Group
404 Hayden Hall
Northeastern University
Boston, MA 02115
Phone: (617) 373-8368
Fax: (617) 373-8814
Email: jbedard@neu.edu

Historian
Jack Robertson
Department of Accounting CBA4M.202
College of Business Administration
University of Texas at Austin
Austin, TX 78712-1172
Phone: (512) 471-5328
Fax: (512) 471-3904
Email: Jack.Robertson@bus.utexas.edu

Financial Accounting and Reporting Section

President
Joseph Magliolo III
Department of Accounting
Cox School of Business
Southern Methodist University
6212 Bishop Boulevard
Dallas, TX 75275-0333
Phone: (214) 768-1678
Fax: (214) 768-4099
Email: jmagliol@mail.cox.smu.edu

President-Elect
Katherine Schipper
Graduate School of Business
University of Chicago
1101 E 58th Street
Chicago, IL 60637-1561
Phone: (773) 702-7281
Fax: (773) 702-0458
Email: katherine.schipper@gsb.uchicago.edu

Vice President (from Practice)
Philip D. Ameen
3735 Easton Turnpike
Fairfield, CT 06431
Phone: (203) 373-2458
Fax: (203) 373-2441
Email: pda@cspa.corp.ge.com

Secretary/Treasurer
Renée A. Price
Accounting Program
School of Business Administration
College of William & Mary
Williamsburg, VA 23185
Phone: (757) 221-1701
Fax: (757) 221-2937
Email: rapric@dogwood.tyler.wm.edu

Immediate Past President
Gregory Waymire
Department of Accounting
College of Business Administration
University of Iowa
Iowa City, IA 52242-1323
Phone: (319) 335-0910
Fax: (319) 335-1956
Email: gregory-waymire@uiowa.edu

Gender Issues in Accounting

Chairperson
D'Arcy A. Becker
Department of Accounting and Finance
College of Business
407 Schneider Hall
University of Wisconsin–Eau Claire
Eau Claire, WI 54702
Phone: (715) 836-6028
Fax: (715) 836-3582
Email: dbecker@uwec.edu

Chairperson Elect
Susanne O'Callaghan
Department of Accounting
Lubin School of Business
Pace University
New York, NY 10038-1502
Phone: (212) 346-1960
Fax: (212) 346-1573
Email: ocallag@pace.edu

Vice Chairperson, Director of Research
Wayne Bremser
Department of Accountancy
College of Commerce and Finance
Villanova University
Villanova, PA 19085-1678
Phone: (610) 519-4314
Fax: (610) 519-5204
Email: drwayneb@yahoo.com

Secretary/Treasurer
Suzanne Pinac-Ward
Department of Accounting
Box 43450 USL
University of Southwestern Louisiana
Lafayette, LA 70504
Phone: (318) 482-5906
Fax: (318) 482-5906
Email: spward@usl.edu

Government and Nonprofit Section

Chairperson
Marc A. Rubin
Department of Accounting
College of Business
Miami University
Oxford, OH 45056-1675
Phone: (513) 529-3381
Fax: (513) 529-6992
Email: rubinma@muohio.edu

Chairperson-Elect
Rita H. Cheng
School of Business Administration
University of Wisconsin–Milwaukee
Milwaukee, WI 53201
Phone: (414) 229-5165
Fax: (414) 229-6957
Email: rcheng@csd.uwm.edu

Vice President for Practice
Sam McCall
Clifton Gunderson LLC
Suite 400, 2 Park Fletcher
5420 West Southern Avenue
Indianapolis, IN 46241-5535
Phone: (317) 484-0534
Fax: (317) 484-0552

Secretary/Treasurer
Donald R. Deis, Jr.
Department of Accounting
College of Business Administration
3101 CEBA Building
Louisiana State University
Baton Rouge, LA 70803-6304
Phone: (504) 388-6214
Fax: (504) 388-6201
Email:acdeis@unix1.sncc.lsu.edu

Information Systems Section

Chairperson
Amy W. Ray
Department of Accounting and Business Law
620 Stokely Management Center
University of Tennessee
Knoxville, TN 37996-0560
Phone: (865) 974-1764
Fax: (865) 974-4631
Email: amyray@utk.edu

Vice Chairperson (Academic)/Chairperson-Elect
Vairam Arunachalam
School of Accountancy
319 Middlebush Hall
University of Missouri-Columbia
Columbia, MO 65211
Phone: (573) 882-1935
Fax: (573) 882-2437
Email: arunachalam@missouri.edu

Immediate Past Chair
Stewart A. Leech
University of Tasmania
School of Accounting & Finance
Box 252-86
Hobart, Tasmania 7001
Australia
Phone: 61 3 6226 2266
Fax: 61 3 6226 7845
Email: stewart.leech@utas.edu.au

Secretary
Kristi Yuthas
School of Business Administration
Box 751
Portland State University
Portland, OR 97207
Phone: (503) 725-3096
Fax: (503) 725-5850
Email: kristiy@sba.pdx.edu

Treasurer
Jon Woodroof
Department of Accounting and Business Law
605 Stokely Management Center
University of Tennessee
Knoxville, TN 37996-0560
Phone: (865) 974-1763
Fax: (865) 974-4631
Email: jwoodroof@utk.edu

Historian
Julie Smith David
Arizona State University
School of Accountancy
Tempe, AZ 85287-3606
Phone: (602) 965-8603
Fax: (602) 965-8392
Email: julie.smith.david@asu.edu

Webmaster
Rayman D. Meservy
Brigham Young University
School of Accountancy & Information Systems
Provo, UT 84602
Phone: (801) 378-2119
Fax: (801) 3780-5933
Email: meservy@byu.edu

International Section

Chairperson
Timothy S. Doupnik
School of Accounting
Darla Moore School of Business
University of South Carolina
Columbia, SC 29208
Phone: (803) 777-7450
Fax: (803) 777-0712
Email: doupnik@darla.badm.sc.edu

Vice Chairperson–Academic
Teresa L. Conover
Department of Accounting
College of Business Administration
University of North Texas
Denton, TX 26203-6677
Phone: (940) 565-3867
Fax: (940) 565-3803
Email: conovert@cobaf.unt.edu

Vice Chairperson–Practice
Larry Bradley, Partner
KPMG
345 Park Avenue
New York, NY
Phone: (914) 253-2976
Fax: (914) 253-3315
Email: lbradley@kpmg.com

Secretary
David J. Sharp
Accounting Faculty
Western Business School
University of Western Ontario
London, Ontario N6A 3K7 Canada
Phone: (519) 661-3945
Fax: (519) 661-3485
Email: dsharp@ivey.uwo.ca

Treasurer
Ajay Adhikari
Department of Accounting
Kogod College of Business Administration
The American University
Washington, D.C. 20016-8044
Phone: (202) 885-1993
Fax: (202) 885-1131
Email: aadhika@american.edu

Management Accounting

President
Kenneth A. Merchant
Leventhal School of Accounting
University of Southern California
Los Angeles, CA 90089-1421
Phone: (213) 740-4842
Fax: (213) 747-2815
Email: kmerchant@sba2.usc.edu

President-Elect
Chee Chow
School of Accountancy
College of Business Administration
San Diego State University
San Diego, CA 92182-8221
Phone: (619) 594-5331
Fax: (619) 594-3675
Email: chow@mail.sdsu.edu

Past President
Michael W. Maher
Graduate School of Management
University of California, Davis
Davis, CA 95616-8609
Phone: (530) 752-7034
Fax: (530) 752-2924
Email: mwmaher@ucdavis.edu

Secretary/Treasurer
John Hardy
School of Accountancy and Information Systems
Marriott School of Management
Brigham Young University
Provo, UT 84602-3068
Phone: (801) 235-9001
Fax: (801) 378-5933
Email: john_hardy@byu.edu

Public Interest

Chair
Lee D. Parker
School of Commerce
University of Adelaide
Adelaide, South Australia 5005
Phone: (61) 83034236
Fax: (61) 83034368
Email: lparker@economics.adelaide.edu.au

Chair-Elect
Sara A. Reiter
Accounting Faculty
School of Management
Binghamton University
Binghamton, NY 13902-6000
Phone: (607) 777-6174
Fax: (607) 777-4422
Email: sreiter@binghamton.edu

Secretary/Treasurer
Lawrence P. Kalbers
School of Professional Accountancy
Long Island University–C. W. Post
720 Northern Boulevard
Brookville, NY 11548
Phone: (516) 299-2092
Fax: (516) 299-2297
Email: lkalbers@liu.edu

Vice President/Director of Research and CPE Coordinator
Vaughn Radcliffe
Department of Accountancy
Weatherhead School of Management
Case Western Reserve University
10900 Euclid Avenue
Cleveland, OH 44106-7235
Phone: (216) 368-2051
Fax: (216) 368-4776
Email: vsr3@po.cwru.edu

Teaching and Curriculum Section

Chairperson
James E. Rebele
Rauch Business Center
Lehigh University
621 Taylor Street
Bethlehem, PA 18015-3118
Phone: (610) 758-3682
Fax: (610) 758-6429
Email: James.Rebele@Lehigh.edu

Vice Chairperson–Academic
Donald E. Wygal
Department of Accounting
Rider University
2083 Lawrenceville Road
Lawrenceville, NJ 08648-3099
Phone: (609) 895-5543
Fax: (609) 896-5304
Email: wygal@enigma.rider.edu

Vice Chairperson–Practice
Bette Kozlowski
KPMG
1600 Market Street
Philadelphia, PA 19103
Phone: (215) 299-4743
Fax: (215) 299-1625
Email: Bkozlowski@KPMG.com

Secretary
Janet D. Cassagio
Accounting and Business Administration Department
Nassau Community College
One Education Drive
Garden City, NY 11530
Phone: (516) 572-7725
Fax: (516) 572-7891
Email: jsbkc@prodigy.net

Treasurer
Sandra Byrd
College of Business
Southwest Missouri State
901 South National Avenue
Springfield, MO 65804-0094
Phone: (417) 836-4181
Fax: (417) 836-6337

Two-Year College Section

Chairperson
Ellen L. Sweatt
Georgia Perimeter College
2101 Womack Road
Dunwoody, GA 30338
Phone: (770) 551-3086
Fax: (770) 604-3795
Email: esweatt@gpc.peachnet.edu

Vice Chairperson
Susan V. Crosson
Santa Fe Community College
3000 NW 83rd Street
Gainesville, FL 32606
Phone: (352) 395-5137
Fax: (352) 395-5137
Email: susan.crosson@santafe.cc.fl.us

Secretary/Editor
Glenn E. Owen
Allan Hancock College
One Hancock Way
Lompoc, CA 93436
Phone: (805) 735-3366 x 5260
Email: glenn@impulse.net

Officer-at-Large
John Ribezzo
Community College of Rhode Island
400 East Avenue
Warwick, RI 02886
Phone: (401) 825-2252
Fax: (401) 825-2365
Email: jribezzo@ccri.cc.ri.us

COMMITTEE CHARGES

ACCOUNTING ACCREDITATION COMMITTEE

Committee on Accounting Education

(Standing Committee of the Association)

Charge: Serve as the coordinating committee for all Association activities that involve education. Specifically:

1. Monitor education activities of relevant organizations such as the AICPA, IIA, IMA, IFAC and coordinate with those organizations, as appropriate.
2. Develop and issue position statements on matters related to accounting education.
3. Develop and recommend to the Executive Committee educational policies for the Association.
4. Inform the Executive Committee concerning the problem of declining numbers of accounting doctoral students, and suggest any actions the Association should consider in this regard.
5. Coordinate the activities of the Association in the field of accounting education through effective liaisons with sections and regions.
6. Coordinate the work of education designated committees, specifically the Assessment Committee, the New Faculty Consortium Planning Committee, the Innovations in Accounting Education Award Committee, the Two-Year Interaction Committee, the Doctoral Fellowships Committee, and the Corporate Accounting Policy Seminar Committee.
7. Work with the Research Advisory Committee, the Director of Faculty Development, regions, sections and the Program Advisory Committee to suggest, coordinate, conduct and evaluate CPE sessions at national, regional and section meetings and through other delivery venues.
8. Work with the Research Advisory Committee and the Director of Faculty Development to develop, coordinate and implement the Association's faculty development activity.
9. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Chair: Jane Mutchler
School of Accountancy
J. Mack Robinson School of Business
Georgia State University
PO Box 4050
Atlanta, GA 30302-4050
Phone: (404) 463-9334
Fax: (404) 651-1033
Email: accjfm@langate.gsu.edu

Members:
A. Faye Borthick, Georgia State University
Elizabeth Hawes-Brown, Keene State College
Jane E. Campbell, Kennesaw State University
Jennifer Francis, Duke University
Alexander L. Gabbin, James Madison University
Ken Harper, DeAnza College
David R. Plumlee, University of Utah
Naomi S. Soderstrom, University of Colorado at Denver
Jean Wyer, PricewaterhouseCoopers

Committee on By-Laws

(Standing Committee of the Association)

Charge: Carry out all activities with regard to changes in the Association's by-laws.
Specifically:

1. Review previous committees' reports and other important background material.
2. Review existing Association's By-Laws and recommend to the Executive Committee revisions where conflicts exist or other changes are needed.
3. Analyze any proposed changes in the By-Laws coming from other sources and recommend to the Executive Committee changes in form or issues that are not anticipated by such proposals.
4. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Chair: Urton L. Anderson
Department of Accounting
College of Business Administration
The University of Texas at Austin
21st and Speedway
Austin, TX 78712-1172
Phone: (512) 471-5339
Fax: (512) 471-3904
Email: urton.anderson@bus.utexas.edu

Members:
Paul A. Copley, University of Georgia
Loren A. Nikolai, University of Missouri–Columbia

Committee on Finance

(Standing Committee of the Association)

Charge: Assist the Executive Committee in monitoring and improving all aspects of the Association's finances.
Specifically:

1. Review the previous committees' reports and other important background material.
2. Evaluate additional or alternative ways to finance existing Association activities.
3. Plan financial strategies for Association initiatives and activities.
4. Work with the 1999–2000 President-elect in preparing the 2000–2001 budget.
5. Monitor the investment of AAA funds in accordance with established Executive Committee policies and procedures.

6. Oversee the budgeting system for the Association, including appropriate costing of products and services. (Issues regarding publications should be coordinated with the Publications Committee.)
7. Review, as needed, Association costs (such as employee benefits) and recommend changes, as appropriate.
8. Undertake special initiatives concerning the financial goals and strategies of the Association as directed by the President or Executive Committee.
9. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Chair: Paul A. Copley
J. M. Tull School of Accounting
255 Brooks Hall
University of Georgia
Athens, GA 30602-6252
Phone: (706) 542-3619
Fax: (706) 542-3630
Email: pcopley@cba.uga.edu

Members:
Mary L. Fischer, University of Texas at Tyler
Ellen Glazerman, Ernst & Young Foundation
Rhoda C. Icerman, Florida State University
Richard J. Murdock, Ohio State University
Larry E. Rittenberg, University of Wisconsin–Madison
Richard A. Turpen, University of Alabama at Birmingham

Committee on Nominations

(Standing Committee of the Association)

Charge: Carry out all necessary activities to precede the Association's annual election. Specifically:

1. Select a list of nominees to AAA offices for election by the membership in Spring 2000 and carry out other duties specified in the By-Laws and Policy and Procedures Manual.
2. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Chair: Katherine Schipper
Graduate School of Business
University of Chicago
1101 E. 58th Street
Chicago, IL 60637-1561
Phone: (773) 702-7281
Fax: (773) 702-0458
Email: katherine.schipper@gsb.uchicago.edu

Members:
W. Steve Albrecht, Brigham Young University
Michael A. Diamond, University of Southern California
Sally M. Jones, University of Virginia
Michael W. Maher, University of California, Davis
Karen V. Pincus, University of Arkansas
Ira Solomon, University of Illinois

Committee on Publications

(Standing Committee of the Association)

Charge: Monitor and coordinate all aspects of the Association's publications. Specifically:

1. Recommend candidates for the editor-elect positions.

2. Evaluate and monitor trends in electronic publishing.
3. Recommend methods and timing for the electronic publication of the Association's journals.
4. Monitor and recommend means of maintaining the economic viability of the Association's publications.
5. Recommend changes in the Association's publications as deemed appropriate.
6. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Chair: William L. Felix, Jr.
Department of Accounting
McClelland Hall 301
Box 210108
University of Arizona
Tucson, AZ 85721-0108
Phone: (520) 621-2443
Fax: (520) 621-3742
Email: wfelix@bpa.arizona.edu

Members:
James J. Jiambalvo, University of Washington
Lisa L. Koonce, University of Texas at Austin
Sandra S. Kramer, University of Florida
Robert Libby, Cornell University
Gary John Previts, Case Western Reserve University
Sandra C. Vera-Munoz, University of Notre Dame

Assessment Committee

Charge: Undertake initiatives to provide assessment guidance for university accounting programs. Specifically:

1. Review the work of the Assessment Task Force of the 1998–99 Accounting Education Advisory Committee.
2. Work with the Vice President/Education and the Director of Faculty Development to carry out the recommendation of the 1998–99 task force concerning the following assessment initiatives:
   - Creation of an assessment database
   - Creation of an innovations in assessment award
3. Identify other initiatives that will assist leaders of accounting programs in meeting their assessment needs.
4. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Chair: Susan E. Perry
Accounting Area
McIntire School Comm.
Monroe Hall
University of Virginia
Charlottesville, VA 22903-2493
Phone: (804) 924-3988
Fax: (804) 924-7074
Email: sep4v@virginia.edu

Members:
Nancy T. Hill, DePaul University
Debra K. Kerby, Truman State University
Kevin M. Misiewicz, University of Notre Dame
Dan N. Stone, University of Illinois
Susan K. Wolcott, University of Denver
A. Faye Borthick (AEC Liaison), Georgia State University

AICPA/AAA Collaborative Award Committee

(Joint with the AICPA)

Charge: Coordinate the AICPA/AAA Collaborative Award Program.

Specifically:

1. Select the recipient(s) of the award according to the agreement between the AICPA and the Association.
2. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Co-Chairs: Ellen Glazerman
Ernst & Young Foundation
787 Seventh Avenue
New York, NY 10019
Phone: (212) 773-5686
Fax: (212) 773-6504
Email: ellen.glazerman@ey.com

Gayle L. Rayburn (AAA)
Dept of Accounting, Finance & Business Law
Harrison College of Business
Southeast Missouri State University
Cape Girardeau, MO 63701-4799
Phone: (573) 651-5125
Fax: (573) 651-2610
Email: c527bua@semovm.semo.edu

Members:

Peter A. Aghimien (AICPA), University of Indiana–South Bend
Thomas B. Clevenger (AAA), Washburn University
Mary B. Curtis (AAA), University of Missouri–St. Louis
Charles F. Malone (AICPA), North Carolina A & T State University
Philip H. Siegel (AAA), Long Island University–C. W. Post
Gerald Smith (AICPA), University of Northern Iowa
Richard H. Tabor (AICPA), Auburn University
Paula B. Thomas (AAA), Middle Tennessee State University

Competitive Manuscript Committee

Charge: Coordinate the Association's Competitive Manuscript Award Program.

Specifically:

1. Select one, two or (at most) three recipient(s) of the Competitive Manuscript Award, using criteria approved by the Executive Committee.
2. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Chair: Robert J. Bloomfield
Johnson Graduate School of Management
379 Sage Hall
Cornell University
Ithaca, NY 14853
Phone: (607) 255-9407
Fax: (607) 254-4590
Email: rjb9@cornell.edu

Members:

Maribeth Coller, University of South Carolina
Marilyn F. Johnson, University of Michigan
Kathy R. Petroni, Michigan State University
Rachel Schwartz, Washington University
Dan A. Simunic, University of British Columbia
Alison Kirby-Jones (RAC Liaison), Boston University

Corporate Accounting Policy Seminar Committee

Charge: Plan and hold the Corporate Accounting Policy Seminar in accordance with established AAA policies.

Specifically:

1. Review the previous committees' reports and other important background material.
2. Plan for and arrange to have the 2000 seminar conducted and administered.
3. Ensure that adequate funding is received for the Corporate Accounting Policy Seminar.
4. Keep the AAA membership, through the Internet or other means, informed of:
    a. Developments in the corporate accounting community.
    b. Research opportunities in the corporate accounting sector.
5. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Chair: John R. M. Hand
Accounting Faculty–CB3490
Kenan-Flagler Business School
University of North Carolina
Chapel Hill, NC 27599-3490
Phone: (919) 962-3173
Fax: (919) 962-0054
Email: handj@icarus.bschool.unc.edu

Members:

Steven Berlin, Kaiser-Francis Oil Company
Michael T. Dugan, University of Alabama
Amy P. Hutton, Harvard University
William J. Ihlanfeldt, Institute of Management Accountants
Joseph J. Martin, International Business Machines Corp.
Daniel F. Sansone, Vulcan Materials Company
Cindy L. Seipel, New Mexico State University

Deloitte & Touche Wildman Medal Award Committee

Charge: To administer the John R. Wildman Medal award program in accordance with the terms of the grant from the Deloitte & Touche Foundation.

Specifically:

1. Select a recipient for the award for the year 1999–2000.
2. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Chair: W. Robert Knechel
Fisher School of Accounting
College of Business Administration
University of Florida
PO Box 117166
Gainesville, FL 32611
Phone: (352) 392-8879
Fax: (352) 392-7962
Email: knechel@notes.cba.ufl.edu

Members:

Larry H. Beard, Emory University
Bruce K. Behn, University of Tennessee
Daivd R. Campbell, Case Western Reserve University
Mark Chain, Deloitte & Touche
Gyan Chandra, Miami University
Richard S. Rand, Jr., Tennessee Technological University
Joanne W. Rockness, University of North Carolina at Wilmington
Jonathan C. Glover (RAC Liaison), Carnegie Mellon University

Distinguished International Lecturers Committee

(Formerly Distinguished International Faculty Exchange Committee)

Charge: Oversee the faculty exchange program and assist Association staff in the administration of the program.

Specifically:

1. Select the U.S./Canadian professor and the foreign professor to be involved in the program for the year 2001 tour and select the schools in the United States and Canada for the 2000 lecture tour.
2. Select the area for the 2002 visit by the U.S./Canadian professor.
3. Assist the Executive Director with announcements, arrangements and follow-up evaluations for the respective visits.
4. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Chair: John T. Ahern
School of Accountancy
College of Commerce
DePaul University
Chicago, IL 60604-2287
Phone: (312) 362-8770
Fax: (312) 362-6208
Email: jahern@wppost.depaul.edu

Members:
Masako N. Darrough, University of California–Davis
Dale L. Flesher, University of Mississippi
Finley O. Graves, Kansas State University
Thomas P. Howard, University of Alabama
David E. Stout, Villanova University
Frederick H. Wu, University of North Texas

Doctoral Consortium Committee

Charge: Plan and hold the 2000 Doctoral Consortium in accordance with established AAA policies.

Specifically:

1. Review previous committees' reports and other important background material.
2. Plan for and arrange to have the 2000 consortium conducted and administered, and consider whether the arrangements for the consortium should be altered in the interests of improving the value of the consortium for attendees.
3. Report on the results and effectiveness of the consortium and recommend any changes to the Executive Committee by August 31, 2000.
4. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Chair: Katherine Schipper
Graduate School of Business
University of Chicago
1101 E. 58th Street
Chicago, IL 60637-1561
Phone: (773) 702-7281
Fax: (773) 702-0458
Email: katherine.schipper@gsb.uchicago.edu

Members:
Mark L. DeFond, University of Southern California
Patrick E. Hopkins, Indiana University
Raffi J. Indjejikian, University of Michigan
Lillian Mills, University of Arizona
Linda Vincent, Northwestern University
Joel S. Demski (RAC Liaison), University of Florida

Doctoral Fellowships Committee

Charge: Carry out all activities with regard to the Association's doctoral fellowship program. Specifically:

1. Select the 1999–2000 recipients of the doctoral fellowship grants using the criteria established by the Executive Committee.
2. Evaluate the doctoral fellowship grant program and recommend changes, as appropriate, to the Executive Committee.
3. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Chair: Kurt J. Pany
School of Accountancy & Information Management
Cl Business Box 873606
Arizona State University
Tempe, AZ 85287-3606
Phone: (602) 965-6849
Fax: (602) 965-8392
Email: kurt.pany@asu.edu

Members:
Lori R. Fuller, University of Deleware
W. Thomas Lin, University of Southern California
Richard A. Riley, West Virginia University
Albert A. Schepanski, University of Iowa
John J. Wild, University of Wisconsin–Madison
David R. Plumlee (AEC Liaison), University of Utah

Environmental Screening Committee

Charge: Assist accounting educators and their schools in continuously monitoring the environment, including important issues and trends, in which accounting education is delivered. Specifically:

1. Study the final report of the 1997–98 Changing Environment Committee, and implement its recommendations as deemed appropriate.
2. Identify best practices for delivering accounting and business education. (In completing this part of the charge, the committee is encouraged to coordinate with the Director of Faculty Development, who is responsible for the emerging benchmark project.)
3. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Chair: Joseph V. Carcello
Department of Accounting & Business Law
College of Business Administration
601 Stokely Management Center
University of Tennessee
Knoxville, TN 37996-0560
Phone: (423) 974-1757
Fax: (423) 974-4631
Email: jcarcell@utk.edu

Members:
Jimmy Barge, Time Warner
Dana R. Hermanson, Kennesaw State University
David N. Ricchiute, University of Notre Dame
Larry P. Scott, PricewaterhouseCoopers
Carl P. Zeithaml, University of Virginia

Faculty Development Advisory Committee

Charge: Serve in an advisory capacity for the Association's Director of Faculty Development. Specifically:

1. Serve as a sounding board for the Director of Faculty Development and Executive Director on new initiatives.
2. Assist in the establishment of faculty development priorities so that an appropriate balance is maintained among the areas of teaching, research, practice, and service.
3. Provide the Executive Committee, through the designated liaison person, reports on the committee' activities for each Executive Committee meeting (dates to be determined).

Co-Chairs: Jane Mutchler
School of Accountancy
J. Mack Robinson School of Business
Georgia State University
PO Box 4050
Atlanta, GA 30302-4050
Phone: (404) 463-9334
Fax: (404) 651-1033
Email: accjfm@langate.gsu.edu

Joel S. Demski
Fisher School of Accounting
College of Business Administration
University of Florida
PO Box 117160
Gainesville, FL 32611-7160
Phone: (352) 392-7597
Fax: (352) 392-7962
Email: demski@dale.cba.ufl.edu

Members:
Dennis M. Bline, Bryant College
Anthony H. Catanach, Villanova University
William N. Dilla, Iowa State University
Jane B. Finley, Belmont University
Ronald A. Kucic, University of Denver
Joseph E. Mori, San Jose State University
John D. Rossi, III, Moravian College
Tracey E. Sutherland, American Accounting Association
Jane F. Mutchler (RAC Liaison), Georgia State University

Financial Accounting Standards Committee

Charge: Coordinate all Association activities with respect to financial accounting standard setting. Specifically:

1. Evaluate selected discussion memoranda and exposure drafts related to financial accounting and reporting in the private sector as they are released by the FASB and other accounting standard-setting groups, and respond to those groups in writing and by appearing at selected public hearings.
2. Stay cognizant of emerging issues related to financial accounting and reporting in the private sector through materials issued by the Emerging Issues Task Force and other

relevant sources, and evaluate, where appropriate, the significance and potential implications of such issues.
3. Meet with the FASB, normally on an annual basis.
4. Evaluate selected discussion memoranda and exposure drafts related to financial accounting and reporting as they are released by the IASC and respond to the IASC in writing.
5. Recognize emerging international issues related to financial accounting, reporting and auditing; alert others inside the Association about their importance to determine the likely significance and potential implications of such issues.
6. Explore the publication of selected responses by the committee in *Accounting Horizons* or other appropriate outlets.
7. Consider and promote ways to increase the quantity and quality of academic input to the standard-setting process.
8. Keep the Association membership, through the Internet or other means, informed of developments in financial accounting standards.
9. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Chair: James M. Wahlen
Department of Accounting & Information Systems
Indiana University
1309 E. 10th Street
Bloomington, IN 47405
Phone: (812) 855-2658
Fax: (812) 855-4985
Email: jwahlen@indiana.edu

Members:
James R. Boatsman, Arizona State University
Robert Herz, PricewaterhouseCoopers
Greg Jonas, Arthur Andersen
Krishna G. Palepu, Harvard University
Stephen G. Ryan, New York University
Katherine Schipper, University of Chicago
Catherine M. Schrand, University of Pennsylvania
Douglas J. Skinner, University of Michigan

Financial Reporting Issues Conference Committee

Charge: Plan and hold the 2000 Financial Reporting Issues Conference in accordance with established AAA policies.

Specifically:
1. Review previous committees' reports and other important background material.
2. Seek the advice of appropriate Association committees on the content and structure of the 1999 conference.
3. Coordinate the conduct and administration of the conference.
4. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Chair: Mary E. Barth
Accounting Faculty
Graduate School of Business
Stanford University
Stanford, CA 94305-5015
Phone: (650) 723-8536
Fax: (650) 725-7979
Email: fbarth@gsb.stanford.edu

Members:

Greg Jonas, Arthur Andersen
James Leisenring, Financial Accounting Standards Board
Cheri Reither, Financial Accounting Standards Board
Douglas J. Skinner, University of Michigan
Sarah Tasker, Cornell University
Terry D. Warfield, University of Wisconsin–Madison
Mohan Venkatachalam, Stanford University (RAC Liaison)

Globalization Initiatives Committee

Charge: Provide direction through the Executive Committee to accelerate the globalization of the Association.

Specifically:

1. Evaluate the mission of the Committee and develop short-term and long-term strategies for globalization.
2. Coordinate the following activities concerning the Globalization Conferences:
   a. Review the 1999 AAA/TAA First Globalization Conference in Taiwan.
   b. Organize the 2000 AAA/BAA Second Globalization Conference in Cambridge.
   c. Make a recommendation concerning, and plan (if appropriate), the Third Globalization Conference.
   d. Develop criteria for future Globalization Conferences including geographical diversity, criteria for partner organizations, and interests of Association members.
3. Network with other international organizations:
   a. Gather information on international organizations.
   b. Maintain frequent contact with international organizations.
   c. Develop cooperation plans with international organizations.
4. Network with sections in the Association:
   a. Coordinate the Association-wide globalization efforts with the activities of the International Accounting section of the Association.
   b. Work with all sections in the Association to promote the globalization to section members.
   c. Urge each section to help promoting participation in the Globalization Conferences and other globalization activities.
5. Coordinating the globalization activities with other Association activities:
   a. Evaluate the Globalization Conference dates to reduce conflicts with other Association activities.
   b. Promote globalization to other Association activities when appropriate.
6. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Chair: C. S. Agnes Cheng
Department of Accounting
204 Business Administration Building
University of Arkansas
Fayetteville, Arkansas 72701
Phone: (501) 575-4057
Fax: (501) 575-4168
Email: cheng@comp.uark.edu

Members:

W. Steve Albrecht, Brigham Young University
Carolyn M. Callahan, University of Notre Dame
Philip D. Drake, American Graduate School of International Management
Timothy S. Doupnik, University of South Carolina
Joanna L. Ho, University of California–Irvine

Innovation in Accounting Education Award Committee

Charge: Coordinate all activities with regard to the Innovation in Accounting Education Award. Specifically:

1. Select the recipient(s) of the Innovation in Accounting Education Award, using the criteria approved by the Executive Committee.
2. Summarize, describe and include on the Internet, projects or innovations nominated for the award.
3. Consider the criteria for the award and recommend changes, as appropriate.
4. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Chair: Sherry K. Mills
Accounting & BCS MSC 3DH
College of Business Administration & Economics
New Mexico State University
Las Cruces, NM 88003-8001
Phone: (505) 646-5681
Fax: (505) 646-1552
Email: smills@nmsu.edu

Members:
Robert D. Allen, University of Utah
Janice L. Ammons, Quinnipiac College
Cathleen S. Burns, New Mexico State University
William A. Raabe, Samford University
Paul Solomon, San Jose State University (former)
E. Kent St. Pierre, University of Deleware
Jane E. Campbell (AEC Liaison), Kennesaw State University

Membership Advisory Committee

(Formerly Membership Services and Subscriptions Committee)

Charge: Advise the staff and Executive Committee on membership services for all current and potential members of the Association. Specifically:

1. Provide input and assistance to the Executive Director and his staff in developing and implementing a member services plan to assure the growth and viability of the Association.
2. Work with the Two-Year College Faculty Relations Committee with regard to the involvement of two-year college faculty in the Association.
3. Develop and assist in implementing recommendations to encourage new faculty to become actively involved in the Association early in their careers.
4. Develop recommendations to address the unique needs of Association members who are retired, including, but not limited to following up on the recommendations of the Forum Retired Members Committee.
5. Develop recommendations concerning ways to keep members active throughout their careers, as well as after they retire.
6. Work with the 1999–2000 President and other Executive Committee members, as appropriate, concerning how they might personally become more involved in bringing new members into the Association.
7. Advise the staff with regard to implementing the Academic Partners program, particularly in areas where that program is intended to motivate increased AAA membership.
8. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Co-Chairs: Thomas J. Frecka
Department of Accountancy
102 College of Business Building
University of Notre Dame
Notre Dame, IN 46556-0399
Phone: (219) 631-8395
Fax: (219) 631-5255
Email: frecka.1@nd.edu

Emeritus Professor Anthony T. Krzystofik
University of Massachusetts
4 Quinlan Drive
Hadley, MA 01035
Phone: (413) 586-3564

Members:
James E. Burton, Middle Tennessee State University
Tonya K. Flesher, University of Mississippi
Mark Higgins, University of Rhode Island
Julia A. Higgs, Florida Atlantic University
Clayton A. Hock, Miami University
Bette Kozlowski, KPMG Peat Marwick
Alan Reinstein, Wayne State University
John Ribezzo, Community College of Rhode Island
Cynthia J. Rooney, University of New Mexico
Donald E. Wygal, Rider University

Minority Faculty Development Committee

Charge: To coordinate Association activities with respect to minority recruitment and development. Specifically:

1. To identify issues of broad concern to minority faculty members and suggest ways the Association can help address these issues.
2. To explore ways in which potential minority candidates can be encouraged to apply to accounting programs and pursue professional careers in accounting education, including liaison with the KPMG Ph.D. project, NABA, INROADS and other groups interested in minority issues, and suggest ways the AAA can assist or work with them or can benefit from their work.
3. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Chair: Ida R. Backmon
Department of Accounting
School Business & Economics
North Carolina A&T State University
Greensboro, NC 27411
Phone: (910) 334-7581, Ext 6004
Fax: (910) 334-7093
Email: robinsi@athena.ncat.edu

Members:
Quinton Booker, Jackson State University
Ruth W. Epps, Virginia Commonwealth University
Fred A. Jacobs, Georgia State University
Jennifer Joe, University of Pittsburgh
Janice R. Mereba, Temple University
Bernard J. Milano, KPMG Peat Marwick
Georgia C. Saemann, University of Wisconsin-Milwaukee
Daniel Shim, Sacred Heart University

New Faculty Consortium Committee

Charge: Plan and hold the 2000 New Faculty Consortium in accordance with established AAA policies.

Specifically:

1. Review previous committees' reports and other important background material.
2. Arrange for the conduct and administration of the consortium.
3. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Chair: Ella Mae Matsumura
Department of Accounting & Information Systems
School of Business
University of Wisconsin–Madison
975 University Avenue
Madison, WI 53706-1323
Phone: (608) 262-9731
Fax: (608) 263-0477
Email: ematsumura@bus.wisc.edu

Members:
S. Jane Kennedy, University of Washington
Steven R. Matsunaga, University of Oregon
Dennis R. Reigle, Arthur Andersen
Paul J. Simko, Emory University
Teri L. Yohn, Georgetown University
Naomi S. Soderstrom (AEC Liaison), University of Colorado at Denver

Notable Contributions to Accounting Literature Award Screening Committee

Charge: Coordinate all activities necessary to screen candidates for the Notable Contributions to Accounting Literature Award.

Specifically:

1. Identify works of exceptional merit from published accounting books and articles that meet the guidelines for the "Notable Contributions" award, as established by the Executive Committee.
2. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Chair: Steven J. Kachelmeier
Department of Accounting
College of Business Administration
University of Texas at Austin
Austin, TX 78712-1172
Phone: (512) 471-3517
Fax: (512) 471-3904
Email: kach@mail.utexas.edu

Members:

Eli Amir, Columbia University
Regina M. Anctil, University of California–Berkeley
Anil Arya, Ohio State University
Benjamin C. Ayers, University of Georgia
Ramji Balakrishnan, University of Iowa
Orie E.Barron, Pennsylvania State University
Shlomo Benartzi, University of California–Los Angeles
Brian J. Bushee, Harvard University
Richard J. Dietrich, University of Illinois
Jere R. Francis, University of Missouri–Columbia
Richard M. Frankel, University of Michigan
Karl E. Hackenbrack, University of Florida
Li-Chin Jennifer Ho, University of Texas at Arlington
James E. Hunton, University of South Florida
Ronald R. King, Washington University
David F. Larcker, University of Pennsylvania
Joan L. Luft, Michigan State University
Laureen A. Maines, Indiana University
Edward L. Maydew, University of North Carolina
Maureen F. McNichols, Stanford University
Mark C. Penno, Purdue University
Shelley C. Rhoades, Villanova University
David N. Ricchuite, University of Notre Dame
Gordon D. Richardson, University of Waterloo
K. Sivaramakrishnan, Carnegie Mellon University
Richard M. Tubbs, University of Connecticut
G. Lee Willinger, University of Oklahoma
Jamie Pratt (RAC Liaison), Indiana University

Notable Contributions to Accounting Literature Award Selection Committee

Charge: Carry out all activities to select recipients of the Notable Contributions to Accounting Literature Award.

Specifically:

1. Select the recipient(s) of the award from those books and articles identified by the Screening Committee as potentially notable contributions in accounting literature.
2. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Chair: William F. Messier Jr.
School of Accountancy
College of Business Administration
Georgia State University
Atlanta, GA 30302-4050
Phone: (404) 651-2611
Fax: (404) 651-1033
Email: accwfm@langate.gsu.edu

Members:

Stephen P. Baginski (AICPA), Indiana University
Thomas J. Frecka (AICPA), University of Notre Dame
Dipankar Ghosh (AAA), University of Oklahoma
Lynford Graham (AICPA), BDO Seidman, LLP
Christine M. Haynes (AAA), Virginia Poly Institute & St Univ.
D. Jordon Lowe (AAA), University of Nevada at Las Vegas
Zoe Vonna Palmrose (AICPA), University of Southern California
Marc A. Rubin (AAA), Miami University
Bill N. Schwartz (AICPA), Virginia Commonwealth University

Outstanding Accounting Educator Award Committee

Charge: Carry out all activities related to the Association's Outstanding Educator Award program.
Specifically:

1. Select one or (at most) two recipient(s) of the Outstanding Accounting Educator Award, using criteria approved by the Executive Committee.
2. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Chair: Lawrence A. Tomassini
Department of Accounting & MIS
Fisher College of Business
Ohio State University
1775 College Road
Columbus, OH 43210-1399
Phone: (614) 292-2082
Fax: (614) 292-2118
Email: tomassini.1@osu.edu

Members:
Dennis R. Beresford, University of Georgia
Mary S. Doucet, California State University–Bakersfield
Michael W. Maher, University of California–Davis
Bernard J. Milano, KPMG Peat Marwick
Cherie J. O'Neil-Wren, Colorado State University
Philip M. J. Reckers, Arizona State University

Practice Advisory Committee

Charge: Provide broad guidance to the Executive Committee with regard to the Association's relations with practice.
Specifically:

1. Provide advice and support for the Vice President/Practice and the President-elect on the implementation of the strategic plan in the goal area of "Contribute to Excellence in Accounting Practice."
2. Develop and assist in implementing a practice (corporate) relations program for the association.
3. Oversee the AAA's participation in a joint initiative tentatively titled "Strategic Thinking in Accounting Education for the 21st Century."
4. Recommend to the Executive Committee other ways to strengthen ties between education, and specifically the Associations, and accounting practice.
5. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Co-Chairs: Mary S. Stone
Culverhouse School of Accountancy
University of Alabama
PO Box 870220
Tuscaloosa, AL 35487-0220
Phone: (205) 348-2915
Fax: (205) 348-8453
Email: mstone@cba.ua.edu

Ellen Glazerman
Ernst & Young Foundation
1285 6th Avenue, 8th Floor
New York, NY 10019
Phone: (212) 773-5686
Fax: (212) 773-6504
Email: ellen.glazerman@ey.com

Members:

William W. Holder, University of Southern California
Karen L. Hooks, Florida Atlantic University
David Landsittle, Arthur Andersen (Retired)
Gary A. Luoma, University of South Carolina
David B. Pearson, Ernst & Young, LLP (Retired)
Gerald D. Searfoss, University of Utah

Professionalism and Ethics Committee

Charge: Foster ethical conduct among members and ethics education and scholarship in the accounting profession.

Specifically:

1. Explore avenues for fostering ethics education and scholarship over time and, where appropriate, make recommendations to the Executive Committee. (The options to be explored will include a possible revision of the case book produced by the committee in prior years.)
2. Propose and, if approved, organize and conduct CPE and concurrent sessions at the regional and national meetings, as warranted.
3. Act as a resource on ethics in the accounting profession to the Executive Committee, regions, sections, other committees and other groups.
4. Work with the Webmasters committee to include teaching materials (cases, teaching notes, syllabi, etc.) related to ethics on the Internet.
5. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Chair: Pamela B. Roush
School of Accounting
College of Business Administration
University of Central Florida
Orlando, FL 32816-1400
Phone: (407) 823-5664
Fax: (407) 823-5741
Email: pamela.roush@bus.ucf.edu

Members:

Mary Beth Armstrong, California Polytechnic State University
Vicki Arnold, Texas Tech University
Charles P. Cullinan, Brynt College
W. Morley Lemon, University of Waterloo
Timothy J. Louwers, Louisiana State University
Bill N. Schwartz, Virginia Commonwealth University
Linda Thorne, York University
Carol F. Venable, San Diego State University

Program Advisory Committee

Charge: Assist in the preparation of the Annual Meeting program.

Specifically:

1. Assist the President and Executive Director in developing the concurrent portion of the technical program for the 2000 Annual Meeting in Philadelphia.
2. Provide advice and consultation to the President concerning the plenary and luncheon speakers for the 2000 Annual Meeting.
3. Evaluate the process by which the content of the annual meeting, and particularly the concurrent sessions, is determined and provide advice and consultation to the Executive Committee with regard to future Annual Meeting programs.
4. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Chair: Judy D. Rayburn
Department of Accounting
Carlson School of Management
University of Minnesota
271-19th Avenue, South
Minneapolis, MN 55455-0413
Phone: (612) 624-3840
Fax: (612) 626-7795
Email: jrayburn@csom.umn.edu

Members:
Frances L. Ayers, University of Oklahoma
Susan Crosson, Santa Fe Community College
Dana A. Forgione, University of Baltimore
James A. Heintz, University of Kansas
George Krull, Grant Thornton
Robert K. Larson, Pennsylvania State University–Harrisburg
Robert J. Ramsey, University of Kentucky
Bill N. Schwartz, Virginia Commonwealth University
Terry Shevlin, University of Washington
Prem N. Sikka, University of Essex
Wim van der Stede, University of Southern California
Dave N. Stewart, Brigham Young University
Kevin D. Stocks, Brigham Young University
Miklos A. Vasarhelyi, Rutgers University–Newark
Dan R. Ward, University of Southwestern Louisiana
Stacey M. Whitecotton, Arizona State University
Christopher J. Wolfe, Texas A&M University

Research Advisory Committee

Charge: Serve as the coordinating committee for Association activities that involve accounting research.

Specifically:

1. Monitor the accounting research activities of other accounting associations (e.g., AICPA, FEI, IIA, and IMA) and coordinate with those organizations, as appropriate.
2. Advise the Vice President–Research in the development and administration of the Association's programs in accounting research, including contributing to effective initiatives undertaken by headquarters' staff involved in faculty development, the regions and the sections.
3. Suggest ways to encourage research in accounting, including research related to discovery, integration, application and teaching.
4. Provide effective research liaison with regions and sections.
5. Coordinate the work of research-designated committees, such as the Competitive Manuscript Committee, the Corporate Accounting Policy Seminar Committee, the Deloitte & Touche Wildman Medal Award Committee, the Doctoral Consortium Committee, the Financial Reporting Issues Conference Committee, the New Faculty Consortium Committee and the Notable Contributions to Accounting Literature Award Selection Committee.
6. Work with AEAC to coordinate and implement the Association's faculty program development activity including:
   a. Coordination of faculty and program development among the Accounting Education Advisory Committee, the Research Advisory Committee, the Webmasters Committee, sponsoring organizations, headquarters' personnel and the director of faculty development.
   b. Evaluation of alternatives to improve the efficiency and effectiveness of processes used in implementing faculty and program development.
   c. Proposal of a detailed budget, in conjunction with the Executive Director and the Director of Faculty Development, to the Executive Committee and allocate, where

authorized, funds specifically designated for this function, including any grants that might be a part of the program.

7. Work with the AEAC, Director of Faculty Development, regions, sections and the Program Advisory Committee to suggest and sponsor research-related CPE sessions at national, regional and section meetings.
8. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Chair: Joel S. Demski
Fisher School of Accounting
College of Business Administration
University of Florida
PO Box 117160
Gainesville, FL 32611-7160
Phone: (352) 392-7597
Fax: (352) 392-7962
Email: demski@notes.cba.ufl.edu

Members:
Shannon W. Anderson, University of Michigan
Tim Bell, KPMG Peat Marwick
Jonathan C. Glover, Carnegie Mellon University
Amy P. Hutton, Harvard University
Alison J. Kirby-Jones, Boston University
Robert C. Lipe, University of Oklahoma
Jamie Pratt, Indiana University
Mohan Venkatachalam, Stanford University
Bente Villadsen, University of Iowa

Securities and Exchange Commission Liaison Committee

Charge: Conduct activities as appropriate to assist communication and interaction between the SEC and the membership of the Association.
Specifically:

1. Prepare and transmit a response to the staff of the Securities and Exchange Commission on selected proposals soliciting views from the public concerning auditing and financial accounting and reporting.
2. Make recommendations and/or develop program(s) that will assist the teaching of, and conducting research on, topics related to the SEC and its activities.
3. Make recommendations to the Executive Committee for activities that will enhance the quality and quantity of interactions between the SEC and the Association.
4. Keep AAA members, through the use of the Internet or other means, informed of:
   a. SEC Developments
   b. Research opportunities related to SEC work or issues with which they are dealing
   c. The SEC Academic Fellow Program
5. Consult with selected regional program chairs early in the academic year to facilitate a session that includes a presentation by the SEC Academic Fellow.
6. Assist the recruiting of SEC Academic Fellow candidates.
7. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Chair: Wayne G. Bremser
Bartley Hall
Villanova University
800 Lancaster Avenue
Villanova, PA 19085
Phone: (610) 519-4314
Fax (610) 519-5204
Email: drwayneb@yahoo.com

Members:

Joseph H. Godwin, Grand Valley State University
John H. Salter, University of Central Florida
Gregory B. Waymire, University of Iowa
Thomas R. Weirich, Central Michigan University

Trueblood Seminars Committee

Charge: Assist Deloitte & Touche in conducting the Trueblood Seminars.

Specifically:

1. In conjunction with Deloitte & Touche, arrange to have the seminars conducted and administered.
2. Report on the results and effectiveness of the seminars and recommend changes by July 15, 2000.
3. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Chair: Marguerite Bishop
Accounting Department
Wharton School 2400 SH-DH
University of Pennsylvania
Philadelphia, PA 19104-6365
Phone: (215) 898-8601
Fax: (215) 573-2054
Email: bishop@wharton.upenn.edu

Members:

Holly Ashbaugh, University of Wisconsin–Madison
Marlene A. Plumlee, University of Utah
Thomas R. Robinson, University of Miami
Robert W. Rouse, College of Charleston
Richard L. Townsend, University of Tennessee

Two-Year College Faculty Relations Committee

(Formerly Committee to Promote Interaction Between Two-Year College Faculty and Faculty at Other Institutions)

Charge: Encourage involvement of two-year faculty in the Association and facilitate interaction between two-year faculty and faculty at other institutions.

Specifically:

1. Review the work of the committee for the last three years and follow up on all recommendations, including those that have been implemented by the Executive Committee as well as those that have not been implemented.
2. Work with the Membership Advisory Committee and Director of Faculty Development to determine additional incentives for two-year faculty members to become active members of the Association.
3. Work with the Director of Faculty Development in the design and implementation of the Academic Partners program as that programs relates to two-year colleges.
4. Determine the role the Association should play, if any, with regard to coordinating curricula between two-year colleges and other institutions to facilitate the efficient transfer of students between institutions.
5. Provide advice and consultation to the Executive Committee with regard to any additional actions it should consider regarding the participation of two-year faculty members in the Association.
6. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Co-Chairs: Frances L. Ayres
School of Accounting
Price College of Business
University of Oklahoma
Norman, OK 73019
Phone: (405) 325-5768
Fax: (405) 325-7348
Email: fayres@ou.edu

Janet D. Cassagio
Accounting & Business Administration
Nassau Community College
One Education Drive
Garden City, NY 11530
Phone: (516) 572-7725
Fax: (516) 572-7891
Email: cassagj@sunynassau.edu

Members:
Thomas B. Calderon, University of Akron
Barbara Chiapetta, Nassau Community College
Susan Crosson, Santa Fe Community College
Bill Harvey, Henry Ford Community College
Andrew Lawrence, Delgado Community College
Kate Mooney, St. Cloud State
Carolyn Strand, Seattle Pacific University
Martha Wartick, University of Northern Iowa
Ken Harper (AEC Liaison), DeAnza College

Webmasters Committee

Charge: Coordinate all Association activities with regard to Internet dissemination of information to members and other interested persons.

Specifically:

1. Review the work of the former Technology Coordination Committee and Webmaster Committee and follow up on recommendations that have not yet been implemented.
2. Coordinate section, regional electronic dissemination activities with the AAA webmaster.
3. Provide strategic direction to the Executive Committee with regard to the dissemination of AAA materials to members and others that includes the following:
   a. A survey of Association members, either separately or as part of a broad-based membership survey, that identifies specific member needs for web resources.
   b. Identification of specific resources that are currently not available and/or are currently available only in hard copy that might be more efficiently disseminated via the web.
   c. Coordination with the work of the Publications Committee with regard to the electronic dissemination of the Association's journals.
4. Provide the Executive Committee, through the designated liaison person, reports on the committee's activities for each Executive Committee meeting (dates to be determined).

Chair: Thomas C. Omer
Department of Accounting
College Business Administration M/C075
University of Illinois at Chicago
Chicago, IL 60607-7123
Phone: (312) 996-4438
Fax: (312) 996-4520
Email: tcomer@uic.edu

Members:

Lorinda P. Adair, Hofstra University
Mark F. Asman, Bowling Green State University
Amelia A. Baldwin, Florida International University
Robert J. Bricker, Case Western Reserve University
Charles E. Davis, Baylor University
Lola W. Dudley, Eastern Illinois University
Ronald J. Huefner, SUNY at Buffalo
Alex Kogan, Rutgers University–Newark
Rayman D. Meservy, Brigham Young University
Robert A. Nehmer, Berry College
Glenn Owen, Allan Hancock College
Andrew Priest, Edith Cowan University
Timothy J. Sale, University of Cincinnati
Dennis R. Schmidt, University of Northern Iowa
Gary P. Schneider, University of San Diego
L. Murphy Smith, Texas A&M University
Monte R. Swain, Brigham Young University
Clinton E. White, Jr. (Skip), University of Delaware

JULY 2000 PLACEMENT ADS

The deadline for information to be included in the "Placement Information" section is two months prior to the date of publication. The ***Review*** *is published on the first day of January, April, July and October. Placement advertising and replies should be sent to the American Accounting Association, 5717 Bessie Drive, Sarasota, FL 34233-2399, ATTENTION: ADVERTISING DEPT. All replies to box numbers should be on separate sheets to facilitate forwarding.*

301 UNIVERSITY OF AKRON, Daverio School of Accountancy, invites applications for a tenure-track position (rank and salary negotiable) starting August 2001. The ideal candidate would have primary teaching and research interest in Auditing. Certification and ability to also teach and conduct research in Financial/Managerial Accounting would be an advantage. Applicants should have excellent teaching skills, demonstrated capacity to conduct publishable research, and willingness and ability to work with the professional community. Interested candidates should respond by October 1, 2000 to Alvin Lieberman, Search Committee Chair, Daverio School of Accountancy, University of Akron, Akron, OH 44325-4802.

302 UNIVERSITY OF BALTIMORE, Merrick School of Business, invites applications for one visiting Accounting faculty position, at the Assistant Professor rank, starting Fall 2000. The appointment is for one year with a possible renewal. Desired qualifications include an earned doctorate in Accounting or Business. Professional certifications and prior teaching experience are highly desirable. All specializations will be considered. The position will remain open until filled. Interested candidates should submit a letter application, along with a current *curriculum vitae* and three letters of recommendation, to Dr. R. R. Vemuganti, Chair of Faculty, Merrick School of Business, University of Baltimore, 1420 North Charles Street, Baltimore, MD 21201; Email: rvemuganti@ubmail.ubalt.edu. The University of Baltimore, a University System of Maryland institution, is the state's only upper-division university offering programs in business, law, and liberal arts. Its undergraduate and graduate programs are accredited by the AACSB. The University is an AA/EOE/IDA institution.

303 UNIVERSITY OF SOUTHERN MISSISSIPPI–GULF COAST, Long Beach, Division of Business Administration, seeks applicants for an anticipated tenure-track Assistant Professor position in Accounting, beginning Fall 2000, with teaching responsibilities in Financial Accounting and Tax. Position qualifications include a Ph.D. in Accounting. The University of Southern Mississippi–Gulf Coast is part of a dual-campus system with a main campus in Hattiesburg, serves two metropolitan statistical areas, and is AACSB-accredited. Applications should include current *curriculum vitae*, evidence of teaching and research effectiveness, a copy of doctoral transcript, and three letters of recommendation. Applications will be accepted until April 3, 2000, or until the position is filled. Contact Walt Taylor, Chair, USMGC–DBA, 730 E. Beach Blvd., Long Beach, MS 39560; Fax: (228) 865-4588; Email: w.taylor@usm.edu. AA/EOE/ADAI.

304 Need temporary faculty? Recently retired (August 1999), award-winning faculty member desires to teach Financial and/or Managerial Accounting courses on a short-term basis. Would prefer graduate (M.B.A.) or executive education opportunities to undergraduate teaching; international teaching opportunities to domestic; and short modular assignments (3–8 weeks) to a full semester. Forty years experience with excellent teaching credentials. Recipient of a number of teaching awards. Resume on request. Please contact Earl A. Spiller, Jr., Distinguished Professor Emeritus, The Darla Moore School of Business, University of South Carolina, Columbia, SC 29208; Email: spillere@darla.badm.sc.edu.

305 TENNESSEE STATE UNIVERSITY invites applications for two tenure-track positions in the Accounting and Business Law Department (http://www.tnstate.edu/acbl) at the rank of Assistant/ Associate Professor with beginning date open (August 2001). Candidates must have Ph.D. or D.B.A. in Accounting (ABD considered) and CPA or other professional certification, and record of research leading to publications in refereed journals. Candidates should be qualified in either (1) all areas of Tax *or* (2) International and Financial Accounting. For additional information, contact Dr. Bob Cluskey at (615) 963-7170; Fax (615) 963-7177; Email bcluskey@tnstate.edu. To apply, submit letter of application, current *curriculum vitae,* and a list of three references to Office of Human Resources, Tennessee State University, 3500 John A. Merritt Blvd., Nashville, TN 37209-1561, and copy to Dr. Bob Cluskey, Head, Department Accounting and Business Law, Tennessee State University, 330 10th Avenue North, Box 137, Nashville, TN 37201-3401.

306 INDIAN INSTITUTE OF MANAGEMENT, Ahmedabad, India (IIM-A), invites applications for tenure-track faculty positions in Financial Accounting, Management Accounting, and Control System. Candidates should be capable of high-quality research and teaching at the graduate level. IIM-A is the leading management education and research institution in India, having been consistently rated number one in the country by *Business Today,* and also rated number one by *Asia by Asia, Inc.* Faculty members are expected to teach in academic programs (M.B.A./Ph.D.), Executive Education Programs, and conduct international-quality research. The vibrant economic climate in India provides exciting opportunities for doing applied work, including consulting. The green 100-acre campus of the Institute provides an outstanding working and living environment, including heavily subsidized housing. Applicants are invited to visit the Institute web site at http://www.iimahd.ernet.in and send resume to Director, Indian Institute of Management, Vastrapur, Ahmedabad–380 015, INDIA; Email: director@iimahd.ernet.in.

307 COLLEGE OF THE HOLY CROSS is seeking candidates for a tenure-track faculty position beginning Fall 2001. Candidates must have a Ph.D. in Accounting or related field. The Professor is required to teach Financial Accounting and offer courses in one or more of the following areas: Managerial, Tax, Auditing, Information Systems, and Advanced Accounting. The College seeks candidates who are dedicated to excellent undergraduate teaching and committed to ongoing research/publication. Holy Cross is a well-endowed, highly selective, undergraduate Jesuit liberal arts institution. Its 174-acre campus is located near Boston in the heart of New England. Cost of living is significantly below the Boston area. The Accounting Major graduates 30 students each year (over 70 percent place with a Big 5 firm). Interested candidates should send a letter of application, *curriculum vitae,* transcripts, and three recent letters of recommendation to Professor David Chu, Department of Economics, College of the Holy Cross, Worcester, MA 01610. Holy Cross is committed to equal opportunity and to enhancing the diversity of its faculty and staff.

308 UNIVERSITY OF CANTERBURY, New Zealand, invites applications for a tenured position of Senior Lecturer (approximately equivalent to U.S. Associate Professor) in the Department of Accountancy, Finance and Information Systems. Applicants must be qualified in Financial Accounting; interest and experience in Auditing is also relevant. The successful candidate will be expected to teach in the undergraduate and graduate programs and to conduct research. Applicants should have strong academic credentials (a Ph.D. degree is preferred) and provide evidence of research and teaching experience. Full details are available by email: h.reeves@regy.canterbury.ac.nz. Information about the Department can be found at http://www.afis.canterbury.ac.nz. Applications close on August 15, 2000 and should mention "Vacancy No. AF108." Please address applications to Human Resources, University of Canterbury, Private Bag 4800, Christchurch, New Zealand. The University has a policy of equality of opportunity in employment.

309 UNIVERSITY OF TEXAS AT EL PASO, College of Business and Accounting Department, AACSB-accredited, invites applications for the position of Assistant/Associate Professor of Accounting with specialization in Accounting Information Systems. Either tenure-track or visiting appointment will be considered. The successful applicant will teach graduate and undergraduate Accounting courses, perform research and publish, and perform academic and professional service. Applicants for Associate Professor must have a record of accomplishment in these areas. Accounting certification (e.g., CPA, CMA, CIA) is highly desirable. Applications will be processed as received. Position will remain open until filled. Send letter of application, resume, and names of three references to Dr. Gary J. Mann, Chair, Department of Accounting, University of Texas at El Paso, El Paso, Texas 79968-0542. For more information please see our web site: http://www.utep.edu. The University does not discriminate on the basis of race, color, national origin, sex, religion, age, disability, or sexual orientation in employment or the provision of services.

310 UNIVERSITY OF AKRON, Daverio School of Accountancy, invites applications, pending approval, for a tenure-track position (rank and salary negotiable) starting August 2001. The ideal candidate would have primary teaching and research interest in Tax. Certification and ability to also teach and conduct research in Financial Accounting would be an advantage. Candidates must have Ph.D. or D.B.A. in Accounting or combination CPA/JD/MST from programs accredited by the AACSB and ABA. Applicants should have excellent teaching skills, demonstrated capacity to conduct publishable research, and willingness and ability to work with the professional community. Interested candidates should respond by October 1, 2000 to Alvin Lieberman, Search Committee Chair, Daverio School of Accountancy, University of Akron, Akron, OH 44325-4802.

311 UNIVERSITY OF NOTRE DAME, Department of Accountancy, invites applications for position openings at the Assistant and Associate Professor levels. All research areas will be considered. Applicants for Assistant Professor positions should expect to complete doctoral degree requirements before the start of the contract period. All candidates should have a strong commitment to scholarly research and excellence in teaching. Salary is very competitive and research support is excellent. Please send *curriculum vitae* and an example of scholarly work to Professor Tom Schaefer, Chair, Department of Accountancy, Room 102D, College of Business Administration, University of Notre Dame, Notre Dame, IN 46556-5646. The University of Notre Dame is an Equal Opportunity/Affirmative Action Employer.

312 UTAH STATE UNIVERSITY invites applications for a tenure-track position, preferably at the Assistant Professor rank, beginning Fall 2001. Responsibilities include teaching at both the undergraduate and master's levels in Accounting Information Systems and other Accounting areas, publishing in nationally recognized journals, participation in academic and professional organizations, and involvement in university service. Doctorate in Accounting or Information Systems required. ABD candidates considered, but dissertation must be completed prior to appointment. Teaching and business experience and professional certification preferred. Application review will commence on November 1, 2000 and continue until a sufficient number of candidates have been identified. Applicants should submit a detailed resume to Dr. Richard L. Jenson, Chair, Faculty Search Committee, School of Accountancy, Utah State University, Logan, UT 84322-3540; Email: rjenson@b202.usu.edu; Phone: (435) 797-2335; Fax: 797-1475. Women and minorities are encouraged to apply.

313 MIAMI UNIVERSITY, Department of Accountancy, invites applicants for a tenure-track position at the Assistant Professor level beginning Fall 2001 (pending funding). Applicants considered in all fields of Accounting based on current needs. Applicants must have a doctorate or dissertation in process. Professional certification and experience are desirable. In addition to teaching excellence, the faculty is expected to conduct and publish research. Salary and benefits are competitive. Miami University has a national reputation for quality teaching. Both the undergraduate and graduate programs are accredited. Please submit resume and letters from three references to Dr. Thomas M. Porcano, Department of Accountancy, Richard T. Farmer School of Business Administration, Miami University, Oxford, Ohio 45056. Application screening for interviews at the AAA Annual Meeting in Philadelphia will begin immediately. Information about the faculty and curriculum is available on the web at http://www.muohio.sba.edu. Miami University is an EEO employer. Women and minorities are encouraged to apply.

314 UNIVERSITY OF COLORADO AT DENVER seeks applicants for one or more faculty positions in Accounting starting in August 2001. Minimum qualifications include a doctoral degree and commitment to excellence in research and teaching. Candidates for advanced rank must demonstrate significant accomplishment in research, teaching, and service. Specializations in Accounting Information Systems, Auditing, and Managerial Accounting are preferred. Applicants with other areas of specialization are also encouraged to apply. Please send a letter of application and *curriculum vitae* to Accounting Recruiting Coordinator, University of Colorado at Denver, Campus Box 165, PO Box 173364, Denver, CO 80217. Review of applications begins immediately, and will continue until the positions are filled. The University of Colorado at Denver is an Equal Opportunity Employer and Educator committed to excellence through inclusiveness.

315 UNIVERSITY OF NEW HAVEN is seeking applicants for tenure-track positions in the areas of Financial Accounting and Tax. The Accounting positions will require teaching graduate and undergraduate courses in the baccalaureate Accounting program and the M.B.A. concentration in Accounting. The applicants should be doctorally qualified, and professional certification (CPA or CMA) with career experiences is desirable. ABD candidates may be considered. Our greatest needs are in Financial Accounting, Accounting Information Systems, and Tax, but we will also consider applicants in other areas of Accounting. The Tax position will require graduate teaching in Corporate Tax, Qualified Retirement Plans, and Basic Income Tax courses in the M.S. in Taxation program. At the undergraduate level the applicant will be required to teach Basic Accounting or Business Law depending on the applicant's qualifications. Either a J.D./L.L.M. in Taxation or a Ph.D. in Accounting is necessary. The successful candidates will have teaching experience and excellent teaching evaluations. Evidence of scholarly publications consistent with AACSB standards is essential. The School is in the fourth year of AACSB candidacy. The University of New Haven is a private comprehensive university with one of the largest M.B.A. programs in New England. Applicants should send *curriculum vitae,* evidence of teaching excellence, and three letters of reference to Robert E. Wnek, Accounting Department Chair, School of Business, University of New Haven, 300 Orange Avenue, West Haven, CT 06516. Screening of applicants begins immediately and continues until the position is filled. The University supports diversity among its faculty and encourages applications from qualified women and minority candidates.

316 WESTERN ILLINOIS UNIVERSITY seeks candidates with doctorate in Accounting or Business Administration with emphasis in Accounting (ABD considered) for opening (contingent upon available funds and approval of the position) commencing January 2001 or August 2001. Area of specialization: Taxation. Teaching experience at upper-division level and CPA desired. Candidates must be committed to teaching excellence and quality research. Rank and salary dependent upon qualifications and experience. WIU's Accounting and Business programs are AACSB-accredited (graduate and undergraduate). Applications will be accepted until the position is filled. Send resume to Professor Penelope J. Yunker, Chair, Department of Accountancy, Western Illinois University, Macomb, IL 61455. WIU is an AA/EO employer. Women, minorities, and persons with disabilities are especially encouraged to apply.

317 PORTLAND STATE UNIVERSITY invites applications for a tenure-track position as an Assistant or Associate Professor effective September 16, 2001. Rank determination is subject to applicant's qualifications and school needs. Applicants should possess a Ph.D. in Accounting or expect completion of Ph.D. program by December 2001. Priority given to candidates with a primary commitment to teaching and research in Auditing and a secondary teaching interest in Financial Accounting or Accounting Information Systems. A commitment to community service appropriate for an urban university is expected. Preference will be given to applicants whose research interests are compatible with existing faculty. Review of applications will begin November 15, 2000. Position is open until filled. Send letter of application, *curriculum vitae,* three letters of recommendation, and examples of recent scholarly work to Dr. Donna Philbrick, School of Business Administration, Portland State University, PO Box 751, Portland, OR 97207-0751. PSU is an Affirmative Action/Equal Opportunity Institution.

318 UNIVERSITY OF MASSACHUSETTS DARTMOUTH, Charlton College of Business, AACSB-accredited, invites applications for a tenure-track or visiting-lecturer position in Accounting anticipated for AY 2000/2001. Applicants must possess a doctorate from an AACSB-accredited institution. Evidence or promise of high-quality teaching and scholarship is expected. Professional certification, experience, and an interest in Financial and/or Managerial Accounting are all considered a plus. The school is located near the southeastern shore of Massachusetts and is near Boston, Providence, and Cape Cod. Interested applicants should submit a letter of interest, current *curriculum vitae,* recommendation letters, recent teaching evaluations, and evidence of scholarly work to Dr. Richard Baker, Chair, Search Committee, Department of Accounting and Finance, College of Business, University of Massachusetts Dartmouth, 285 Old Westport Rd., N. Dartmouth, MA 02747; Email: rbaker@umassd.edu; Fax: (508) 999-8776. The University of Massachusetts Dartmouth is an Equal Opportunity/Affirmative Action Employer.

319 UNIVERSITY OF DELAWARE, Department of Accounting and Management Information Systems, is seeking an Accounting/Management Information Systems faculty member capable of both quality research and teaching at the undergraduate and graduate levels. The University of Delaware, ranked 25th among the nation's top public universities by *U.S. News and World Report,* is located on a beautiful campus in Newark, Delaware. The Department of Accounting and Management Information Systems is part of the College of Business and Economics, which serves about 1,700 undergraduate majors and approximately 670 graduate students. The undergraduate and graduate Accounting programs are AACSB-accredited. Representatives will be attending the AAA Annual Meeting in Philadelphia, PA. Qualified candidates should send a *curriculum vitae,* three letters of reference, and summaries of teaching performance to Professor Clinton White, Search Committee, Department of Accounting and Management Information Systems, College of Business and Economics, University of Delaware, Newark, DE 19716-2715. The deadline for application is September 1, 2000; the date for filling the position is September 2001. The University of Delaware is an Equal Opportunity Employer, and encourages applications from minority group members and women.

320 UNIVERSITY OF SOUTH FLORIDA, School of Accountancy, invites applications for tenure-earning Assistant Professor specializing in Accounting Information Systems. Position involves active participation in Master of Accountancy program with track concentration in AIS, undergraduate teaching, and possible involvement with Ph.D. and M.B.A. programs. Primary teaching responsibilities are on the Tampa campus with occasional assignments on regional campuses. Other duties will include conducting research leading to publications in refereed journals and participation in service to academic and professional communities. Ph.D. with a major concentration in Accounting or near completion required; professional certification desirable. Application deadline: October 9, 2000. Address applications to Robert M. Keith, Director, School of Accountancy, College of Business, University of South Florida, BSN 3403, 4202 E. Fowler Avenue, Tampa, FL 33620-5500. For additional information: Phone: (813) 974-6516; Fax: (813) 974-6528; Email: rkeith@coba.usf.edu. USF is an Equal Opportunity Equal Access/Affirmative Action Institution.

321 BAYLOR UNIVERSITY seeks to fill the position of Chairperson of the Department of Accounting and Business Law in the Hankamer School of Business. Candidates must have a Ph.D. in Accounting or related area, professional certification, and a commitment to excellence in teaching and research. The Department offers three degree programs: B.B.A., Master of Taxation, and Master of Accountancy. Applications will be reviewed beginning July 1, 2000, and will be accepted until the position is filled. To be assured full consideration applications should be received by October 15, 2000. Send resume along with indication of an active Christian faith commitment to Dr. Del Chesser, Department of Accounting and Business Law, Baylor University, Box 98002, Waco, TX 76798-8002. Baylor is affiliated with the Baptist General Convention of Texas. As an Affirmative Action/Equal Employment Opportunity Employer, Baylor University encourages minorities, women, veterans, and persons with disabilities to apply.

322 BOSTON COLLEGE, Wallace E. Carroll School of Management, invites applications for a tenure-track Accounting position for Fall 2001. The qualified candidate must demonstrate interest in and capacity to conduct high-quality scholarly research as well as exhibit a high level of teaching competence and innovation. We seek individuals with an openness to diverse intellectual outlooks and research methodologies and an appreciation for Boston College's liberal arts tradition. We offer a collegial environment and an energetic faculty with a variety of intellectual interests and close ties to the Boston financial and academic communities. Direct inquiries to Gregory Trompeter, Chair, Department of Accounting, Carroll School of Management, Boston College, Chestnut Hill, MA 02467. The Carroll School of Management is an Equal Opportunity Employer and strongly encourages applications from individuals who will enhance the diversity of our faculty.

323 VILLANOVA UNIVERSITY invites applicants for the position of Chairperson, Department of Accountancy, effective Fall 2001. Appointment will be at the Associate or Professor level. Earned doctorate (Accounting) required; professional certification preferred. A strong research and publication record is also desirable. The successful candidate will provide leadership for both the undergraduate and graduate programs in accounting. Ability to interact well with the business community required. Review of applications begins June 1st and will continue until the position is filled. Representatives will be attending the AAA Annual Meeting in Philadelphia. Send application letter and *curriculum vitae* to David Stout, College of Commerce and Finance, Villanova University, 800 Lancaster Avenue, Villanova, PA 19085-1678. Villanova is a Roman Catholic university sponsored by the Augustinian Order. An AA/EEO employer, we seek a diverse faculty committed to scholarship, service, and teaching, who understand, respect, and can contribute to the University's mission and values.

324 VILLANOVA UNIVERSITY invites applicants for a tenure-track position effective Fall 2001; all ranks and areas (except tax) considered. Earned doctorate in Accounting and professional certification required. The successful candidate will teach in our graduate programs (Executive M.B.A. and Master's in Accountancy) and must have the potential for teaching excellence and for publishing high-quality research. Teaching load: 15 credits per year. Review of applications begins June 1st and will continue until the position is filled. Representatives will be attending the AAA Annual Meeting in Philadelphia. Send application letter, *curriculum vitae,* and writing sample, and have three letters of recommendation sent, to David E. Stout, College of Commerce and Finance, Villanova University, 800 Lancaster Avenue, Villanova, PA 19085-1678. Villanova is a Roman Catholic university sponsored by the Augustinian Order. An AA/EEO employer, we seek a diverse faculty committed to scholarship, service, and teaching, who understand, respect, and can contribute to the University's mission and values.

325 NORTHERN ILLINOIS UNIVERSITY invites applications for several anticipated tenure-track openings for Accountancy faculty, in Managerial Accounting, Tax, Information Systems, or Financial Accounting, at the rank of Assistant or Associate Professor beginning Fall 2001. Information about our nationally ranked program can be found at http://www.cob.niu.edu/accy/accy.html. Candidates must be qualified to teach at the undergraduate and graduate levels. Candidates should have, or expect to have, a Ph.D. degree when employment begins. Teaching experience, business experience, and professional certification is desirable. We are particularly interested in faculty who want to combine their research and teaching with a close working relationship with the professional business community. NIU representatives will be available at the AAA Annual Meeting in Philadelphia. Applications should be sent to Gregory Carnes, Chair, Department of Accountancy, Northern Illinois University, DeKalb, IL 60115. Review of applications will begin October 1, 2000, and will continue until the position is filled. Northern Illinois University is an Affirmative Action/Equal Employment Opportunity Institution.

326 ITHACA COLLEGE invites applications for a tenure-track faculty position in Accounting. Primary responsibilities include teaching Auditing, with preference given to candidates interested in teaching Advanced Accounting and electives to undergraduate Accounting and Business majors. Candidates should hold a Ph.D. in Accounting. Applicants who are ABD may be considered. Rank is open. Achieving tenure at Ithaca College is dependent on evidence of excellence in college-level teaching, scholarly research, and service. The position will become available August 15, 2001. Review of applications will begin immediately and will continue until the position is filled. Applicants should send a letter of application, *curriculum vitae,* and names of at least three references to Office of the Dean, School of Business, Ithaca College, Ithaca, NY 14850. Ithaca College is an Equal Opportunity/Affirmative Action University. Members of underrepresented groups (including people of color, persons with disabilities, Vietnam veterans, and women) are encouraged to apply.

327 GEORGETOWN UNIVERSITY, McDonough School of Business, invites applications for tenure-track faculty positions at all levels for Fall 2001. A visiting position may also be available for the Spring 2001 term. Applicants must have a Ph.D. in Accounting or a related field, and have a strong commitment to scholarly research and excellence in teaching. Representatives will be available to meet qualified candidates at the American Accounting Association Annual Meeting in Philadelphia. Please respond by August 1, 2000 if interested in interviewing at the meetings. Applicants should submit a letter of interest, *curriculum vitae,* student evaluations (if applicable), and samples of publications or working papers to Professor Thomas B. Cooke, Accounting Area Coordinator, McDonough School of Business, Georgetown University, Washington, D.C. 20057. Georgetown University is an Affirmative Action/Equal Opportunity Employer.

328 UNIVERSITY OF DAYTON invites applications for two tenure-track positions in Accounting at the Assistant/Associate Professor rank for August 2001. Doctorate in Accounting, or close ABD, from AACSB-accredited school is required. Professional certification desirable. Collegiality essential. Demonstrated ability/potential for publishable research and excellent teaching necessary. Teaching at undergraduate and M.B.A./fifth-year Accounting levels. One position in Managerial Accounting, requiring team teaching and interaction with business community. Another position is in Taxation, plus a second area. Level-1 AACSB-accreditation, with research and other support available in pleasant environment; 3:2 teaching load. Qualified applicants should send letter and *curriculum vitae* to Ron Burrows, Chair, Department of Accounting, University of Dayton, Dayton, OH 45469-2242; Phone: (937) 229-4616; Fax: (937) 229-2270; Email: burrows@udayton.edu. The University of Dayton is an Equal Opportunity/Affirmative Action employer. Women, minorities, individuals with disabilities, and veterans are encouraged to apply. The University of Dayton is firmly committed to the principle of diversity.

329 WAYNE STATE UNIVERSITY'S AACSB-accredited School of Business Administration invites applications for the position of Professor and Chair of the Department of Accounting. The incoming Chair will have the opportunity to take an already strong department and shape it into an internationally visible program in this Carnegie Research University I institution. An earned doctoral degree in Accounting and credentials warranting rank as Professor are required. Administrative experience and team orientation are desirable. Salaries are highly competitive with a comprehensive benefits package. Review of applications will begin on July 1, 2000 and continue until the position is filled. Start date is negotiable. Send letter, resume, and the names, addresses, and phone numbers of three references to Assistant Dean of Administrative Affairs, School of Business Administration, Wayne State University, Detroit, MI 48202. Wayne State University is an Equal Opportunity/Affirmative Action Employer.

330 SUFFOLK UNIVERSITY, Sawyer School of Management, invites applications for a tenure-track Accounting position at the Assistant or Associate Professor level, beginning Fall 2001. Candidates will teach courses in undergraduate and graduate Financial Accounting and Taxation. A doctorate in Accounting is required by the time the appointment commences. For Associate Professor, the candidate needs to have compiled a record that demonstrates excellence in research and teaching. The business programs of the School are accredited by AACSB. The School offers M.S.A., M.S.T., and B.S.B.A. in Accounting degrees, and M.B.A. with an Accounting concentration, as well as an online M.B.A. degree. The Sawyer School is located on historic Beacon Hill in the heart of Boston. Salary is competitive. Submit *curriculum vitae,* names of three references, and a letter outlining teaching/research interests to Professor James P. Angelini, Chair, Accounting Department, Sawyer School of Management, Suffolk University, 8 Ashburton Place, Beacon Hill, Boston, MA 02108-2770. Suffolk University is an Equal Opportunity Employer.

331 CLARK UNIVERSITY invites applications for Assistant or Associate Professor of Accounting. Candidates should hold a Ph.D. in Accounting with either a CPA or CMA and must have a strong interest in doing quality research. Appointments at the rank of Associate Professor will be considered for applicants with recognized accomplishments in research. Teaching duties may include courses in Financial and Management Accounting, Information Systems, or Auditing, depending on the candidate's interests. Clark is a small, selective university, which fosters an unusual combination of academic rigor and close working relationships with students. The M.B.A. and baccalaureate degrees are accredited by the AACSB. Clark's location in central Massachusetts (40 miles from Boston) offers an exceptionally rich cultural life and the natural beauty of New England. The position will be available on September 1, 2001. Professor Dileep Dhavale will conduct initial interviews of the candidates at the AAA Annual Meeting in Philadelphia. Please send your *curriculum vitae* to Graduate School of Management, Clark University, 950 Main Street, Worcester, MA 01610-1477; Email: ddhavale@clarku.edu.

332 FLORIDA INTERNATIONAL UNIVERSITY (FIU), School of Accounting, seeks a Director. The position is tenured at the rank of Full Professor or Senior Associate Professor. The initial Director appointment is for three years and can be renewed. The expected date of appointment is January 15, 2001, though the reporting date may be later. The School of Accounting has 1,400 students at graduate and undergraduate levels. The Director reports to the Dean of the College. Globalization and Information Technology are major strategic initiatives within the School and College. Our graduate programs include an M.S. in Taxation and M.ACC. in Accounting. Screening will begin immediately and will continue until the position is filled. However, all applications received by July 31, 2000 are assured of consideration. Candidates for this position should have an earned Ph.D. in Accounting, and have a solid record of accomplishments in Accounting and/or Auditing instruction and in research published in refereed journals. Professional experience, managerial and public, and certification are desirable. Please submit a detailed *curriculum vitae,* accompanied by an example of scholarly work, to Dr. Dana Farrow, Associate Dean and Chair–Recruiting Committee, College of Business Administration, Florida International University, University Park, Miami, FL 33199. FIU is a member of the State University System of Florida, and is an Affirmative Action/Equal Access/Equal Opportunity Employer.

THE ACCOUNTING REVIEW

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Does Mandated Audit Communication Reduce Opportunistic Corrections to Manage Earnings to Forecasts?

Robert Libby
Cornell University
William R. Kinney, Jr.
University of Texas at Austin

ABSTRACT: This paper reports two experiments in which Big 5 audit managers estimate reported (audited) earnings conditional on analysts' consensus forecast, auditing standards, and auditor discovery of a quantitatively immaterial earnings overstatement. We find that auditors judge overstatement correction less likely if it would cause a missed forecast, even for objectively measured misstatements. This behavior is consistent with SEC Chairman Levitt's concerns about opportunistic corrections to manage earnings to forecasts. Also, SAS No. 89's mandated representations and communications do not increase corrections that would cause a missed forecast, indicating that the Auditing Standards Board has limited ability to reduce opportunistic corrections through such regulations.

Key Words: *Audit regulation, Analysts' forecasts, Earnings management, Opportunism, Misstatement correction.*

Data Availability: *Contact the authors.*

I. INTRODUCTION

In a major speech, SEC Chairman Arthur Levitt (1998) lists what he calls "abuse of materiality" as one of the five most common "gimmicks" used to manage earnings to meet analysts' consensus forecasts. He suggests that some companies fail to correct

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misstatements less than a *quantitative* materiality guideline such as 5 percent or 3 percent of net income, if correcting the misstatement would cause earnings to fall below (or "miss") the consensus forecast. Differential correction of misstatements to meet forecasts is a form of earnings management because it reflects opportunistic accounting for realized outcomes.[1]

In response to Chairman Levitt's concern, in April 1999, the Auditing Standards Board (ASB) issued an exposure draft (ED) of an auditing standard designed to "encourage audit clients to record financial statement adjustments proposed by auditors," and "clarify management's responsibility for the disposition of financial statement misstatements brought to its attention" (AICPA 1999a, 5). The ED's essence was adopted in December 1999 as Statement on Auditing Standards (SAS) No. 89 (AICPA 1999b).[2] The SAS requires that, in its representation letter to the auditor, management express its belief that any misstatements aggregated by the auditor that are not corrected in the financial statements are immaterial to the statements taken as a whole. It also requires that the auditor inform the audit committee about any misstatements brought to management's attention that remain uncorrected in the financial statements.

The ASB intended SAS No. 89 to increase misstatement correction by increasing the disutility to management of issuing audited financial statements containing quantitatively immaterial misstatements. It is unusual in that it (1) specifies actions of company management and auditor communication rather than audit evidence or report modification, (2) applies to items that are deemed quantitatively immaterial as well as to material items, and (3) arose in response to SEC officials' concerns about possible management of reported (audited) earnings toward an unregulated target—analysts' forecasts. The speed with which SAS No. 89 developed is also unusual since it progressed from an exposure draft to final form within nine calendar months.

This paper reports results of two experiments that assess the degree to which auditors believe that (1) correction of a quantitatively immaterial earnings overstatement depends upon whether the correction would cause reported earnings to fall below the consensus forecast, and (2) implementation of SAS No. 89 requirements would increase correction of such overstatements. Healy and Wahlen's (1999) review of earnings management research notes that recent archival studies conclude that firms manage earnings to meet or exceed forecasts (e.g., Degeorge et al. 1999; Burgstahler and Eames 1999; Brown 1999), but do not reveal the particular methods that firms use to increase reported earnings to meet this benchmark or test whether more stringent standards can mitigate earnings management.

Our study complements archival research through an experiment in which we manipulate the forecast benchmark and auditing standards while holding all else constant. This allows us to: (1) test for opportunistic misstatement correction, a specific form of earnings management, (2) establish baseline data for assessing the prevalence of this form of earnings management under prior auditing standards (testing the validity of Chairman Levitt's concerns), and (3) provide *ex ante* evidence about the new standard's potential effectiveness.

Based on a case scenario, participating Big 5 firm audit managers estimate reported (audited) earnings that would result from any management-auditor negotiation given analysts' consensus earnings per share (EPS) forecast, auditing standards, and objectivity of measurement of an earnings overstatement noted by the auditor.[3] We manipulate the consensus EPS forecast such that full (negative) correction results in earnings slightly above or below the forecast, and we manipulate auditing standards as pre-SAS No. 89 or SAS No. 89. Both manipulations are between-subjects. To assess the effect of measurement objectivity, the misstatement in experiment 1 involves an accounting estimate beyond the limits of a "reasonable" estimate and, in experiment 2, a data-accumulation-based misstatement.

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[1] Earnings management has been defined as "a purposeful intervention in the external financial reporting process, with the intent of obtaining some private gain (as opposed to, say, merely facilitating the neutral operation of the process)" (Schipper 1989, 92).

[2] Audit opinions under Generally Accepted Auditing Standards (GAAS) contain the qualifier "in all material respects" when referring to compliance with Generally Accepted Accounting Principles (GAAP), and auditors may issue unqualified audit opinions even if the financial statements are known to contain misstatements that the auditor believes are immaterial, individually and in the aggregate.

In experiment 1, few auditors applying pre-SAS No. 89 auditing standards expect correction of any portion of a misstated accounting estimate that leads to overstated earnings, and the consensus EPS forecast does not affect their expectations. This suggests that under prior standards management did not correct quantitatively immaterial earnings overstatements, regardless of the forecast. Under SAS No. 89, more audit managers estimate that some correction would be made, but only when it does not cause a missed forecast. When faced with the data-accumulation-based misstatement in experiment 2, more auditors expect correction. However, the amount corrected depends on the forecast, and SAS No. 89 has no additional effect on expected correction. Auditors expect a majority of clients to make full correction only if the forecast will not be missed.

Our results imply opportunistic correction of quantitatively immaterial misstatements to manage earnings to forecasts, and auditor acceptance of the practice. They also indicate that SAS No. 89 is unlikely to eliminate this opportunistic behavior. By implication, these results suggest that SEC regulation of registrant management in correcting misstatements (e.g., SAB No. 99) and regulation of audit committee oversight regarding quantitatively immaterial misstatements may be needed.

II. BACKGROUND AND HYPOTHESIS DEVELOPMENT

Managing Earnings to Forecasts

Regulators (e.g., Turner 1998), journalists (e.g., Byrnes et al. 1998; Vickers 1999), and archival researchers have investigated earnings management aimed at meeting implicit and explicit earnings benchmarks. For example, archival research by Degeorge et al. (1999), Burgstahler and Eames (1999), and Brown (1999) concludes that profitable companies manage earnings to avoid reporting earnings lower than analysts' consensus forecasts.[4]

To the degree that management sees the consensus earnings forecast as a target or benchmark, the benefit of earnings management should be greatest when it moves earnings from below, to, at, or above the consensus forecast. Consequently, we expect auditors to estimate less frequent and smaller corrections of misstatements when correction would move earnings below the forecast. This suggests the following hypothesis:

> **H1:** The average correction of a quantitatively immaterial earnings overstatement will be smaller when full correction would move reported earnings below the consensus forecast.

SAS No. 89

Archival research provides indirect evidence that high-quality auditors and audit committees limit *non-GAAP* manipulation of earnings (DeFond and Jiambalvo 1993; Dechow et al. 1996). However, many interpret the manipulation targeted by Chairman Levitt as *within-GAAP* because the differences are *quantitatively* immaterial. Prior to SAS No. 89, auditing standards were silent concerning both management's representation letter reference to *immaterial* uncorrected misstatements and the auditor's presentation of the misstatements to the audit committee. Since pre-audit earnings reflect management's preferred use of accounting discretion and neither auditing standards nor the U.S. Securities Acts require that the auditor insist on correcting quantitatively immaterial misstatements, we expect few such misstatements to be corrected under pre-SAS No. 89 standards.

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[3] By estimating actual reported earnings, they are implicitly estimating the portion of the misstatement that management would correct.

[4] Burgstahler and Dichev (1997) and Degeorge et al. (1999) also find evidence of earnings management to avoid losses and earnings decreases.

SAS No. 89 is the first regulation that might limit opportunistic correction of quantitatively immaterial misstatements as an earnings management tool. SAS No. 89 requires management to take one of two actions concerning misstatements aggregated by the auditor. Management can: (1) correct the misstatements, or (2) represent to the auditor in writing that any uncorrected misstatements are, individually and in the aggregate, immaterial. Specifically, the management representation letter would contain the statement:

> We believe that the effects of the uncorrected financial statement misstatements summarized in the accompanying schedule are immaterial, both individually and in the aggregate, to the financial statements taken so as a whole. (AICPA 1999b, 5)

The standard also requires that the auditor inform the client's audit committee about the uncorrected misstatements (AICPA 1999b, 7).

SAS No. 89 could increase the disutility to management of not correcting misstatements. This is due to the increased threat of audit committee challenge of uncorrected misstatements, and possible future legal and regulatory actions based on management's written claim that misstatements are immaterial. This suggests the following hypothesis:

> **H2:** The average correction of a quantitatively immaterial earnings overstatement will be larger under SAS No. 89 than under prior auditing standards.

Quantitative and Qualitative Materiality

Chairman Levitt's (1998) speech and Chief Accountant Turner's (1998) letter to the AICPA were not the first warnings of the importance of qualitative factors in judging the materiality of a misstatement. In Statement of Financial Accounting Concepts No. 2, the FASB states that a financial statement omission or misstatement is material if:

> in the light of surrounding circumstances, the magnitude of the item is such that it is probable that the judgment of a reasonable person relying on the report would have been changed or influenced by the inclusion or correction of the item. (FASB 1980, para. 132)

Auditing texts discuss "surrounding circumstances" or qualitative factors that can make small misstatements "material." For example, Stettler (1977, 112) and Arens and Loebbecke (1997, 250) suggest considering whether the misstatement affects earnings trends and the relation of earnings to other benchmarks. This is consistent with the SEC's position, and suggests that opportunistic correction of discovered misstatements, such as not correcting when the correction would move earnings below a target, would likely affect a reasonable person's judgment.

The literature also mentions the precision with which misstatement can be estimated as a qualitative materiality factor (e.g., Stettler 1977, 112). Hackenbrack and Nelson (1996), Kennedy et al. (1997), Phillips (1999), and others suggest that aggressive reporting is more likely when significant judgment is required. Braun (2000) suggests that auditors are more likely to insist on correcting *material* misstatements that are more objectively determined. Similarly, the "reasonableness" standard in Section 13(b)(2) of the Securities Exchange Act can be interpreted to allow "reasonable minds" to differ more when the correct amount is less-objectively determined. Experiment 1 tests for opportunistic correction of a subjectively measured misstatement, while in experiment 2, the misstatement is objectively measured.

Experimental Approach

In the experiments, we elicit Big 5 audit managers' estimates of reported (audited) earnings that would result from any management-auditor negotiation of audit findings. Although management should be in the best position to predict corrections they would record, management's experience is limited to relatively few correction negotiations. More important, as Chairman Levitt's (1998) speech indicates, management's own interests are served by maintaining the option not to correct quantitatively immaterial misstatements. Consequently, we did not ask client management to participate both because management likely lacks broad experience and they may have incentives not to respond truthfully in estimating corrections they would record.

Auditors are in the best position to estimate their own behavior (e.g., what uncorrected misstatements they would accept when applying GAAS), and they have second-best knowledge of management's response to existing and proposed reporting regulations. Also, they are likely to have experience negotiating corrections across several client contexts, and they do not have management's direct incentives to bias their responses. Therefore, we rely on auditors' relatively informed and unbiased estimates of reported (audited) earnings.

We conducted the experiments in December 1998 and March 1999. We wanted to act before auditors were conditioned by the ASB's April 1999 ED or the essentially similar language of SAS No. 89 adopted in December 1999. The short time frame restricted the available participant pool. Ideally, we would have run experiments 1 and 2 simultaneously with audit partners as participants. Due to the speed with which the ASB acted, our access was limited to two groups of audit managers, and the groups were not available simultaneously. However, we were able to run both experiments before the ED became public and potentially affected judgments of those in the available participant pool.

The short time frame also limited research controls that we could apply. For example, we could not administer a separate debriefing questionnaire or follow up on the responses of particular auditors. We also agreed not to divulge respondents' affiliation to minimize potential effects of litigation and client pressures. The final section of the paper discusses resulting limitations.

III. EXPERIMENT 1

Each participating audit manager reads background materials for the case and estimates the final reported (audited) earnings for the year based on: (1) pre-audit earnings and other financial statement items, (2) misstatement magnitude, sign, and objectivity of measurement, (3) analysts' consensus forecast, and (4) auditing standards in place. The general company background and the first two factors (which determine quantitative materiality) are held constant. The forecast and auditing standards are manipulated between-subjects to test our hypotheses.

The case involves earnings overstatement in a firm reporting positive earnings. We do not suggest to participants that management intended to manipulate earnings because management's intent might affect the auditor's assessments of engagement risk as well as affect their responsibilities under Section 13(b)(2) and the Foreign Corrupt Practices Act. We do not specify other important company attributes such as last year's earnings, the existence or future need for "cookie jar reserves," and other historical factors, so the participants relied on their average experiences to make further assumptions. Since participants are randomly assigned to treatments, any between-subjects differences in those assumptions should not bias our results.

Method

Participants

Seventy audit managers (mean assurance services experience = 4.7 years, mean total business experience = 7.6 years) from various offices of a Big 5 CPA firm participated in experiment 1. All of the auditors had primary responsibilities for nonfinancial clients. On average they spent 27 percent of their time with public clients,[5] of which an average of 67 percent were followed by financial analysts. Participants completed the experimental task during a firm-sponsored training course under the supervision of firm personnel and one of the authors' assistants.

Design and Procedures

All participants viewed a short case based on a medium-sized public auto parts manufacturer, Capital Auto Parts, Inc. (CAP), which has a single discovered misstatement due to an accounting estimate.[6] The instrument was pilot tested by ten faculty and Ph.D. students at the University of Texas at Austin, as well as the five practitioner members of the Big 5 Audit Materiality Task Force, and we made minor wording changes to clarify the instructions.

In experiment 1, the auditor of CAP believes that management's estimate of the allowance for inventory obsolescence is less than the closest "reasonable estimate" for the allowance, and the understated allowance results in overstated pre-audit earnings. According to SAS No. 47 (AICPA 1984, para. 29) the difference between the recorded estimate and the closest reasonable estimate is "likely misstatement." Auditors with responsibilities for nonfinancial clients should be familiar with this type of subjectively measured misstatement.

The sign and magnitude of the misstatement (minus $0.03 per share) is held constant across all experimental conditions, as are the pre-audit values determining quantitative materiality of the misstatement (sales, assets, inventories, and earnings per share). Consequently, all typical quantitative measures of a material amount and overstatement magnitude are constant across conditions. We set sales, assets, inventories, and earnings so each measure of materiality falls just below the minimum quantitative materiality limits cited in the authoritative literature (less than 3 percent of earnings, less than 1 percent of inventory, and less than 0.3 percent of total assets).[7] All Big 5 Materiality Task Force members serving as pilot subjects assessed the misstatement as quantitatively immaterial.[8] Since pre-audit EPS and the misstatement are held constant, fully corrected EPS is also held constant.

---

[5] Inferences are unaffected by deletion of the 15 participants who have spent less than 10 percent of their time with public companies.

[6] Braun (2000) suggests that auditors are more likely to insist on recording a single (material) misstatement than one or both of two misstatements that total to the same amount.

[7] Chairman Levitt's (1998) speech describes 5 percent, and to a lesser extent 3 percent, of earnings as typical benchmarks.

[8] We did not ask for the auditors' opinions about the quantitative or qualitative materiality of the misstatements. Since we were unable to administer a separate debriefing questionnaire, our concern that such questions may produce demand effects led us not to include them in our instrument. Instead, we relied upon our pilot subjects (including Task Force members) and authoritative literature to assure that the misstatements were quantitatively immaterial. To the extent that some participants did judge the misstatements to be quantitatively material, they would be more likely to require correction of the misstatement. Thus, our results may understate the prevalence of this form of earnings management for quantitatively immaterial amounts.

Auditing standards and the consensus EPS forecast are manipulated in a 2 × 2 between-subjects design. The case first presents audit managers with a short request to participate and guarantee of confidentiality. A description of either the then current (pre-SAS No. 89) or the proposed (SAS No. 89) auditing standards is presented on the same page (see Figure 1, Panels A and B, respectively). *Current standards* are quoted from SAS Nos. 61 and 85. The descriptions note that current auditing standards are silent about both reference to

FIGURE 1
Auditing Standards Presented to Participants

Panel A: Current Standards

Auditing Standards

On the next page, you will be asked to estimate your typical public client's response to a set of circumstances. When making that assessment, assume that the following (current) auditing standards and firm policies are in place.

> Auditing standards and your firm's policies require, among other things, that the auditor obtain from management a representation letter that indicates:
>
> > there are no material transactions that have not been properly recorded in the accounting records underlying the financial statements. (SAS No. 85, AICPA 1998, App. A, para. 6)
>
> and that the auditor shall:
>
> > inform the audit committee about adjustments arising from the audit that could, in his judgment, either individually or in the aggregate, have a significant effect on the entity's financial reporting process. (SAS No. 61, AICPA 1989, para. 9)

Current auditing standards are silent concerning management's representation letter reference to immaterial unrecorded audit differences. Auditing standards are also silent concerning presentation to the audit committee of immaterial unrecorded audit differences.

Panel B: Proposed Standards

Auditing Standards

On the next page, you will be asked to estimate your typical public client's response to a set of circumstances. When making that assessment, assume that the following (proposed) auditing standards and firm policies are in place (*changes are in italics*).

> Auditing standards and your firm's policies require, among other things, that the auditor obtain from management a representation letter that indicates:
>
> > there are no material transactions that have not been properly recorded in the accounting records underlying the financial statements. *All financial statement misstatements identified and discussed with us in the course of the audit have been recorded except for those summarized in the accompanying [Schedule of Unrecorded Audit Adjustments]. In our opinion, the effects of not recording such identified financial statement misstatements are, both individually and in the aggregate, immaterial to the financial statements of the Company taken as a whole.* (SAS No. 85, AICPA 1998, App. A, para. 6)
>
> and that the auditor shall:
>
> > inform the audit committee about adjustments arising from the audit that could, in his judgment, either individually or in the aggregate, have a significant effect on the entity's financial reporting process, *and present to the audit committee the [Schedule of Unrecorded Audit Adjustments] that management has represented as immaterial.* (SAS No. 61, AICPA 1989, para. 9)

immaterial misstatements in management's representation letter and presentation to the audit committee. This assures that audit managers in both conditions are fully informed of the relevant standards for both material and immaterial misstatements. *Proposed standards* append to the relevant passages of existing auditing standards the wording from a preliminary version of the ED available at the time the experiment was administered.[9] These additions appear in italics, as they normally would when the firm distributes amended standards to its auditors.

On the following page, participants are presented with a brief description of the client, its summarized financial data, the analysts' consensus forecast, and a description of the misstatement (see Figure 2; manipulated amount is in brackets). The consensus forecast is either $1.05 or $1.09. Pre-audit earnings are $1.10, a $0.03 overstatement is discovered, so full correction would lead to final reported earnings of $1.07. Consequently, when the consensus EPS forecast is $1.05 (the *$0.02 above condition*), full misstatement correction leaves reported earnings at $0.02 above the forecast. When consensus EPS is $1.09 (the *$0.02 below condition*), full misstatement correction moves reported earnings $0.02 below the forecast. The relationships among pre-audit EPS, fully corrected EPS, and the consensus forecast in the two conditions appear in Figure 3.

By holding pre-audit and fully corrected earnings constant and manipulating the forecast, we separate the effects of intent to meet or beat the consensus forecast from the general motivation to report higher earnings, and at the same time hold constant all quantitative materiality measures. As noted earlier, we investigate earnings management in a manner similar to recent archival studies by assessing estimates of the distribution of reported (audited) earnings given the consensus forecast. If the distribution differs across levels of the forecast, we *infer* earnings management (and auditor acceptance) through opportunistic misstatement correction.

Participants make two judgments about likely magnitudes of reported EPS (see Figure 2). First, participants estimate the "most likely EPS amount a public client such as CAP would *finally report* in the audited financial statements for the year" (emphasis in the original). Second, participants provide a *complete probability distribution* over the feasible values of reported (audited) EPS. This allows assessment of distribution changes across other reported values even if the most likely (modal) value does not change. Limits to both scales are set at pre-audit EPS and fully corrected EPS based on the assumption that pre-audit EPS already reflects management's preferred use of accounting discretion and there is no reason to report EPS outside these amounts. Participants also complete a questionnaire requesting background information.

Results

Seventy audit managers estimated the most likely reported EPS value, while 65 also estimated the probability distribution.[10]

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[9] There is no significant change in wording of the ED. Experiment 1 was administered in December 1998, before any of the Big 5 firms had provided guidance on recording immaterial audit differences or the importance of analysts' forecasts. The final version of SAS No. 89 deleted the first italicized sentence for SAS No. 85 (referencing management-auditor discussions), substituted "We believe" for "In our opinion," and included the representation as a separate item in the letter. Also, the final version changed and augmented the SAS No. 61 guidance to read:

> We believe that the effects of the uncorrected financial statement misstatements summarized in the accompanying schedule are immaterial, both individually and in the aggregate, to the financial statements taken as a whole.

[10] One of the five did not complete requirement 2 in the current standards conditions, and four in the proposed standards conditions. Requirement 2 is a more difficult task than requirement 1.

FIGURE 2
Case Information for Experiment 1

Company Information

An audit client, Capital Auto Parts, Inc. (CAP), is a medium-sized automobile parts manufacturer that sells to automakers and to auto parts wholesalers. For the current year, relevant ***pre-audit*** balances are:

Sales	$1,300 million
Total assets	$1,100 million
Inventories	$375 million
Net earnings	$110 million
EPS	$1.10 per share

Analysts' Consensus Forecast

CAP stock is publicly traded, and has attracted a modest following by financial analysts. For the current year, financial analysts' consensus EPS forecast for CAP is:

Forecasted EPS $1.05[$1.09] per share

Audit Differences

Only one potentially important audit difference has been uncovered by the audit staff. The difference is due to management's estimate of the inventory obsolescence allowance. The audit staff believes that the recorded allowance is outside a reasonable range by an amount that ***overstates current earnings per share by $.03***. This amount is less than 3% of earnings, less than 1% of inventory, and less than .3% of total assets.

Required: *Assuming auditing standards and firm policies described on the previous page are in force, answer the following questions.*

1. The most likely EPS amount a public client such as CAP would ***finally report*** in the audited financial statements for the year is (circle one):

$1.07	$1.08	$1.09	$1.10
All of audit difference recorded			None of audit difference recorded

2. The proportion of public clients in similar circumstances that would ***finally report*** each of these audited EPS amounts for the year is (fill in each blank; amounts should total to 100%):

EPS	$1.07	$1.08	$1.09	$1.10
Percent Reporting	_____%	_____%	_____%	_____%

Most Likely Reported EPS

We test Hypotheses 1 and 2 using ANOVA to compare participants' estimates of the most likely reported EPS across treatments. Hypothesis 1 predicts a larger (downward) correction, and thus a smaller reported (audited) EPS amount, when full correction results in EPS *above* as opposed to *below* the forecast. We test this prediction via the main effect of forecast manipulation. Hypothesis 2 predicts a larger correction, and thus a smaller reported EPS, under the *proposed standards* than under the *current standards.* We test this

FIGURE 3
Relations among Pre-Audit EPS, Fully Corrected EPS, and the Consensus EPS Forecast for Experimental Conditions

Consensus Forecast $1.05: $0.02 *Below* Fully Corrected EPS	**Consensus Forecast $1.09: $0.02 *Above* Fully Corrected EPS**
Pre-audit EPS = 1.10	Pre-audit EPS = 1.10
	Forecasted EPS = 1.09
Fully corrected EPS = 1.07	Fully corrected EPS = 1.07
Forecasted EPS = 1.05	

prediction via the main effect of the standards manipulation. If the effectiveness of SAS No. 89 depends on whether the correction results in EPS above as opposed to below the forecast, the interaction of the standards and forecast manipulations could be significant.

Table 1, Panel A reports descriptive statistics on audit managers' estimates of the most likely reported EPS, and Panel B reports ANOVA results. The main effects of forecast (p = 0.007) and standards (p = 0.012) are significant in the expected directions and their interaction (p = 0.036) is significant.[11] The equality of variance assumption is violated based on Levine's test. However, inferences based on the Brown-Forsythe modified ANOVA are identical.

Since the interaction is significant, we examine the simple main effects of auditing standards at each level of the forecast. Recall that in all conditions, pre-audit EPS is $1.10. When the consensus forecast is $1.05 (so full correction would still produce earnings *$0.02 above* the forecast), the mean estimated EPS is significantly lower under *proposed standards* ($1.083) than under *current standards* ($1.095) (F = 12.01, p = 0.001). However, when the consensus forecast is $1.09 (so full correction would move earnings *$0.02 below* the forecast), the mean estimated EPS is not significantly different between the *proposed standards* ($1.096) and *current standards* ($1.097) indicating that the new standard has no effect (F = 0.09, p = 0.76). Overall, these results suggest that SAS No. 89 will be effective in increasing the proportion of immaterial misstatements that are corrected only when the correction does not cause earnings to miss the forecast.

Because participants' responses for the most likely reported EPS could take on one of only four values, we also analyze the data using log-linear models that treat participant responses as categorical data. Table 2, Panel A presents a three-way contingency table detailing participants' responses, while Panel B presents the likelihood ratio tests of partial association of the log-linear models.

Panel A of Table 2 details the effect of the analysts' forecast and proposed standards based on frequencies of particular responses. The consensus forecast has a major effect on misstatement correction magnitudes. Only one auditor predicts a correction that causes a missed forecast. In addition, the new standards lead more auditors to expect at least partial correction in both forecast conditions. However, under the proposed standards, when the consensus forecast is $1.05, auditors who expect a correction expect the full $0.03 correction, but when the consensus forecast is $1.09, auditors who expect a correction estimate only a $0.01 correction. Thus, even the proposed standards do not cause audit managers to expect a correction that would cause a missed forecast.

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[11] All reported test probabilities are two-tailed. This interpretation is conservative for main effects because we make directional predictions.

TABLE 1
Experiment 1 (Accounting Estimate Misstatement) Auditors' Estimates of the Most Likely Reported (Audited) EPS across Experimental Conditions

Panel A: Descriptive Statistics [mean, *standard deviation*, (n)]

		Auditing Standards[b]		
		Current	*Proposed*	*Overall*
Analysts' Consensus Forecast[a]	$1.05	$1.095[c] *0.010* (19)	$1.083 *0.015* (18)	$1.089 *0.014* (37)
	$1.09	$1.097 *0.008* (19)	$1.096 *0.005* (14)	$1.096 *0.006* (33)
	Overall	$1.097 *0.009* (38)	$1.089 *0.013* (32)	

Panel B: ANOVA

Effect	*F*	*df*	*Prob.*
Forecast	7.66	1,66	0.007
Standards	6.70	1,66	0.012
Interaction	4.59	1,66	0.036

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[a] Analysts' consensus forecast took one of two values: $1.05 where full correction of the overstatement would result in reported earnings $0.02 above the forecast and $1.09 where full correction of the overstatement would result in reported earnings $0.02 below the forecast.

[b] The auditing standards presented included relevant excerpts from then current (pre-SAS No. 89) standards or those same excerpts with proposed standards appended to the relevant excerpts.

[c] Participant responses could take on any of the four values limited by pre-audit EPS of $1.10 and fully corrected EPS of $1.07.

Since EPS represents the four values that the dependent variable can take, the EPS × Forecast and EPS × Standards interactions provide tests of Hypotheses 1 and 2, respectively, that are comparable to main effects tests in the ANOVA. The three-way interaction provides a test comparable to the two-way interaction in the ANOVA. Consistent with the ANOVA, the EPS × Forecast ($p = 0.000$) and EPS × Standards ($p = 0.025$) interactions are significant, and the three-way interaction ($p = 0.073$) is marginally significant. To reduce the potential effect of some small-expected cell frequencies and to more directly test our hypotheses about corrections that result in missing vs. making the forecast, we combine the cells where earnings miss the higher consensus forecast of $1.09 ($1.07 and $1.08) into one group and those that make that forecast ($1.09 and $1.10) into a second group. This cutoff is directly relevant to testing the effects of forecast-based earnings manipulation. The results are virtually identical ($p = 0.000$, $p = 0.032$, and $p = 0.074$, respectively).

Probability Distribution of Reported EPS

The second measure requires participating audit managers to estimate the complete probability distribution over feasible values of final reported EPS. Descriptive statistics on the auditors' estimates appear in Table 3, Panel A, and we report MANOVA results in Panel

TABLE 2
Experiment 1 (Accounting Estimate Misstatement) Frequencies of Auditors' Estimates of the Most Likely Reported (Audited) EPS across Experimental Conditions

Panel A: Contingency Table

			Most Likely Reported (Audited) EPS[c]				
		Auditing Standards[b]	*$1.07*	*$1.08*	*$1.09*	*$1.10*	*Total*
Analysts' Consensus Forecast[a]	$1.05	Current	2	1	1	15	19
		Proposed	10	0	0	8	18
		Total	12	1	1	23	37
	$1.09	Current	1	0	3	15	19
		Proposed	0	0	6	8	14
		Total	1	0	9	23	33

Panel B: Log-Linear Model: Tests of Partial Association

Effect	*df*	*Likelihood Ratio Chi-Square*	*Prob.*
EPS	3	64.27	0.000
Forecast	1	0.23	0.632
Standards	1	0.51	0.473
EPS × Forecast	3	19.23	0.000
EPS × Standards	3	9.32	0.025
Stan. × Forecast	1	0.01	0.922
EPS × F × S	2	5.23	0.073

[a] Analysts' consensus forecast took one of two values: $1.05 where full correction of the overstatement would result in reported earnings $0.02 above the forecast and $1.09 where full correction of the overstatement would result in reported earnings $0.02 below the forecast.

[b] The auditing standards presented included relevant excerpts from then current (pre-SAS No. 89) standards or those same excerpts with proposed standards appended to the relevant excerpts.

[c] Participant responses could take on any of the four values limited by pre-audit EPS of $1.10 and fully corrected EPS of $1.07.

B. Since the four responses must add to 100 percent, one value is redundant and is excluded from the MANOVA analysis.[12]

The MANOVA results are consistent with the analyses of the most likely reported EPS presented in the prior section. Overall, the expected correction magnitudes depend on the consensus forecast (F = 7.72, p = 0.000) and auditing standards (F = 2.27, p = 0.089). In addition, the significant interaction reveals that the effect of auditing standards depends on the level of the forecast (F = 2.65, p = 0.057). Tests for simple main effects show that when the consensus forecast is $1.05, auditing standards have a significant effect on the distribution of expected correction (F = 2.68, p = 0.054). The most significant change is

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[12] The significance tests are not affected by which value is excluded.

TABLE 3
Experiment 1 (Accounting Estimate Misstatement) Auditors' Estimates of the Proportion of Clients Reporting Each EPS Amount across Experimental Conditions

Panel A: Descriptive Statistics

			Mean Estimate of Proportion[c] of Clients Reporting EPS =			
		Auditing Standards[b]	*$1.07*	*$1.08*	*$1.09*	*$1.10*
Analysts' Consensus Forecast[a]	$1.05	Current	16.9	9.7	12.5	60.8
		Proposed	37.5	6.4	5.4	50.7
	$1.09	Current	7.8	1.4	15.3	75.5
		Proposed	12.5	7.2	33.1	47.3

Panel B: MANOVA

Effect	*F*	*df*	*Prob.*
Forecast	7.72	3,59	0.000
Standards	2.27	3,59	0.089
Interaction	2.65	3,59	0.057

Panel C: Simple Effects of Standards

	F	*df*	*Prob.*
Forecast = $1.05	2.68	3,59	0.054
Forecast = $1.09	2.25	3,59	0.092

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[a] Analysts' consensus forecast took one of two values: $1.05 where full correction of the overstatement would result in reported earnings $0.02 above the forecast and $1.09 where full correction of the overstatement would result in reported earnings $0.02 below the forecast.

[b] The auditing standards presented included relevant excerpts from then current (pre-SAS No. 89) standards or those same excerpts with proposed standards appended to the relevant excerpts.

[c] Participants provided estimates of the complete probability distribution over the four values limited by pre-audit EPS of $1.10 and fully corrected EPS of $1.07.

that SAS No. 89 increases the percentage expected to correct the entire $0.03 overstatement ($F = 7.31$, $p = 0.009$). When the consensus forecast is $1.09, auditing standards have a marginally significant effect ($F = 2.25$, $p = 0.092$). For the $1.09 forecast, the effect of standards is most apparent in the percentage of companies expected to correct only $0.01 of the overstatement ($F = 5.06$, $p = 0.028$), which would still allow making the forecast. As noted above, these results support our prior conclusion that SAS No. 89 promotes misstatement correction only by amounts that still allow management to make the consensus forecast.

Discussion

Our analyses of both dependent measures paint a consistent picture. First, regardless of the relationship between pre-audit EPS and the consensus analyst forecast, when overstatement is due to an insufficient accounting estimate, audit managers believe that most quantitatively immaterial earnings overstatements are not corrected under current standards. Second, the evidence suggests that corrections are made only if they do not move earnings below the consensus forecast. This finding is consistent with opportunistic correction of quantitatively immaterial misstatements (a form of earnings management) that is accepted by the auditor.

The results also indicate that SAS No. 89 standards are likely to increase the number of immaterial corrections of misstated accounting estimates only when correction does not cause earnings to fall below the forecast. As a consequence, the standards are not likely to be effective in meeting the SEC's goals of reducing opportunistic correction of quantitatively immaterial earnings overstatements to meet analysts' forecasts.

IV. EXPERIMENT 2

Experiment 2 tests the generalizability of the experiment 1 results to situations where the correct GAAP value is objectively determined. Because objectivity of misstatement measurement has long been considered an important qualitative materiality factor, we expect an objectively measured misstatement to be more frequently corrected.

Method

Participants

An additional 43 audit managers (mean assurance services experience = 8.3 years, mean total business experience = 11.7 years) from various offices of the same Big 5 CPA firm participated in experiment 2. All have primary responsibilities for nonfinancial clients. On average they spent 33 percent of their time with public clients,[13] of which an average of 66 percent were followed by financial analysts. Since no firm training was in process at the time this experiment was prepared, the experimental task was mailed from and returned to the firm's executive office. Forty-four percent of the auditors responded to the mailing, and they performed the task approximately 16 weeks after participants in the first experiment.[14] We discuss potential effects of differences in participant experience, timing, and form of administration in Section V.

Design and Procedures

Experiment 2 is identical to experiment 1 except that we use an objectively determined[15] inventory overstatement described as: "The difference is due to an inadvertent duplication of counts establishing the ending inventory of finished auto parts." All other aspects of the case are the same. We manipulate the same two variables (consensus forecast and auditing standards) between-subjects, and auditors respond to the same two estimation requirements. Experiment 2 participants are also asked slightly different questions in the debriefing questionnaire and are asked to explain their responses to the case.

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[13] Inferences are unaffected by deletion of the nine participants who have spent less than 10 percent of their time with public companies.

[14] During the winter of 1998–99, some firms began to issue internal guidance to implement the essence of the ED. While some participants in experiment 2 mentioned SEC interest in the topic, none mentioned receiving such guidance from their firm.

[15] Our selection of this type of misstatement as objectively determined is supported in the FEI Materiality Conference Call. During that call, Joe Bernadino, managing partner, North American Assurance and Business Advisory Services at Arthur Andersen, cited an equivalent example related to the physical inventory.

Results

Most Likely Reported EPS

Table 4, Panel A reports descriptive statistics on the audit managers' estimates of the most likely reported EPS, and Panel B reports ANOVA results. The effect of the forecast is marginally significant (p = 0.07), and the effects of standards and the interaction are not significant. As predicted by H1, participants expect a larger correction when it does not cause a missed forecast. Levine's test indicates that the equality of variance assumption is not violated. Recall that in all conditions, pre-audit EPS is $1.10. When the consensus forecast is $1.05, auditors' mean estimate of reported EPS is $1.083. However, when the forecast is $1.09, the mean estimates are $1.090, indicating a smaller correction. Thus, even though the overstatement is objectively determined, on average, our auditors do not expect corrections that would cause earnings to miss the forecast.

Table 5, Panel A presents the three-way contingency table detailing participants' responses, and Panel B presents the likelihood ratio tests of partial association of the log-linear models. The EPS × Forecast interaction is the only significant effect (p = 0.03).

TABLE 4
Experiment 2 (Data Accumulation Misstatement)
Auditors' Estimates of the Most Likely Reported (Audited) EPS across Experimental Conditions

Panel A: Descriptive Statistics [mean, *standard deviation*, (n)]

		Auditing Standards[b]		
		Current	Proposed	Overall
Analysts' Consensus Forecast[a]	$1.05	$1.082[c] *0.014* (9)	$1.083 *0.015* (10)	$1.083 *0.014* (19)
	$1.09	$1.091 *0.012* (14)	$1.090 *0.012* (10)	$1.090 *0.012* (24)
	Overall	$1.087 *0.013* (23)	$1.086 *0.014* (20)	

Panel B: ANOVA

Effect	*F*	*df*	*Prob.*
Forecast	3.57	1,39	0.066
Standards	0.00	1,39	0.994
Interaction	0.03	1,39	0.856

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[a] Analysts' consensus forecast took one of two values: $1.05 where full correction of the overstatement would result in reported earnings $0.02 above the forecast and $1.09 where full correction of the overstatement would result in reported earnings $0.02 below the forecast.

[b] The auditing standards presented included relevant excerpts from then current (pre-SAS No. 89) standards or those same excerpts with proposed standards appended to the relevant excerpts.

[c] Participant responses could take on any of the four values limited by pre-audit EPS of $1.10 and fully corrected EPS of $1.07.

TABLE 5
Experiment 2 (Data Accumulation Misstatement)
Frequencies of Auditors' Estimates of the Most Likely Reported (Audited) EPS across Experimental Conditions

Panel A: Contingency Table

			Most Likely Reported (Audited) EPS[c]				
		Auditing Standards[b]	*$1.07*	*$1.08*	*$1.09*	*$1.10*	*Total*
Analysts' Consensus Forecast[a]	$1.05	Current	4	2	0	3	9
		Proposed	5	1	0	4	10
		Total	9	3	0	7	19
	$1.09	Current	3	0	4	7	14
		Proposed	2	1	2	5	10
		Total	5	1	6	12	24

Panel B: Log-Linear Model: Tests of Partial Association

Effect	*df*	*Likelihood Ratio Chi-Square*	*Prob.*
EPS	3	14.13	0.003
Forecast	1	0.58	0.445
Standards	1	0.21	0.647
EPS × Forecast	3	10.98	0.027
EPS × Standards	3	0.23	0.972
Stan. × Forecast	1	0.22	0.636
EPS × F × S	2	2.24	0.326

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[a] Analysts' consensus forecast took one of two values: $1.05 where full correction of the overstatement would result in reported earnings $0.02 above the forecast and $1.09 where full correction of the overstatement would result in reported earnings $0.02 below the forecast.

[b] The auditing standards presented included relevant excerpts from then current (pre-SAS No. 89) standards or those same excerpts with proposed standards appended to the relevant excerpts.

[c] Participant responses could take on any of the four values limited by pre-audit EPS of $1.10 and fully corrected EPS of $1.07.

Combining responses with EPS estimates of $1.07 and $1.08 (those less than the higher forecast of $1.09) and $1.09 and $1.10 (those greater than or equal to $1.09) produces similar results ($p = 0.01$). Panel A indicates that when the forecast is $1.05, 12 of the 19 audit managers (63.2 percent) expect correction of $0.02 or more. However, when the forecast is $1.09, only six of the 24 audit managers (25 percent) expect correction of $0.02 or more. Again, the new auditing standards have no significant effect on expected correction when the misstatement is objectively determined.

Probability Distribution of Reported EPS

Table 6, Panel A reports descriptive statistics for auditors' estimates of the complete probability distribution over feasible values of final reported EPS, and Panel B reports

TABLE 6
Experiment 2 (Data Accumulation Misstatement)
Auditors' Estimates of the Proportion of Clients Reporting Each EPS Amount across Experimental Conditions

Panel A: Descriptive Statistics

			Mean Estimate of Proportion[c] of Clients Reporting EPS =			
		Auditing Standards[b]	*$1.07*	*$1.08*	*$1.09*	*$1.10*
Analysts' Consensus Forecast[a]	$1.05	Current	31.7	18.3	10.6	39.4
		Proposed	35.6	8.9	8.3	47.2
	$1.09	Current	26.1	6.1	29.6	38.2
		Proposed	24.0	9.0	26.0	41.0

Panel B: MANOVA

Effect	*F*	*df*	*Prob.*
Forecast	4.70	3,36	0.007
Standards	0.20	3,36	0.899
Interaction	0.66	3,36	0.375

[a] Analyst' consensus forecast took one of two values: $1.05 where full correction of the overstatement would result in reported earnings $0.02 above the forecast and $1.09 where full correction of the overstatement would result in reported earnings $0.02 below the forecast.

[b] The auditing standards presented included relevant excerpts from then current (pre-SAS No. 89) standards or those same excerpts with proposed standards appended to the relevant excerpts.

[c] Participants provided estimates of the complete probability distribution over the four values limited by pre-audit EPS of $1.10 and fully corrected EPS of $1.07.

results of the MANOVA. Results are consistent with the above analyses. Only the forecast is significant (p = 0.007).

Responses to Debriefing Questions

Since experiment 2 was conducted by mail using a single mailing, we could not follow up with debriefing questions regarding materiality judgments and other important process elements without potentially inducing demand effects. However, we did obtain related results from an open-ended question. After completing experiment 2, participants were asked to "Please explain your reasoning behind your answers to questions 1 and 2 in the short exercise."[16] All 43 participants responded to the question, with 29 auditors mentioning that the item is immaterial, and only four judging it to be material. Three of the latter four were in the $1.05 forecast condition, and they all indicated that complete correction is required, but the one in the $1.09 forecast condition indicated that only a $0.01 correction would be required, still allowing earnings to make the forecast (inferences are not changed by deleting these four participants' responses). Overall, these results suggest that our inferences are not attributable to differential perceptions of materiality across treatments.

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[16] Experiment 1 asked participants for their general comments on the experiment, but did not ask for explanations of their responses.

Twenty-six auditors specifically mentioned the relationship between the forecast EPS and fully corrected EPS in their reasoning. Twenty-one suggested that management would resist correction, find offsetting amounts elsewhere in the financial statements, or seek a compromise correction. Twelve audit managers reported that the relationship between forecast and audited EPS has been a contentious issue with at least one of their clients. Only one suggested managements generally prefer to be accurate.

Six of the 20 auditors in the SAS No. 89 condition mentioned communication with the audit committee as a potentially contentious issue, while two indicated it would be ineffective (one reasoned that *both* management and board members are compensated with stock options, and thus face the same incentives). Only four auditors mentioned increased SEC scrutiny of earnings management as a reason for their response, and no one in the current standards condition mentioned the proposed auditing standards.

We also asked all participants whether the provisions of SAS No. 89 would cause clients to place more pressure on auditors to aggregate fewer small misstatements on their workpapers. Of the 42 participants who answered this question, 29 indicated that the standards would increase such pressure. This pressure could lessen the effectiveness of any new regulation related to quantitatively immaterial misstatements.

Discussion

Results from both dependent measures in experiment 2 suggest that audit managers believe that, even when a misstatement is an acknowledged error in a physical count, most quantitatively immaterial overstatements would not be corrected if doing so would cause the firm to miss the consensus forecast. The results also indicate that the proposed standards will not increase corrections in these circumstances.

In responses to the debriefing questionnaire, the auditors indicate that management has strong preferences for making the consensus forecast and will use opportunistic correction of quantitatively immaterial misstatements if necessary to meet the forecast, consistent with Chairman Levitt's concerns. Since the ASB has no authority over registrant managements, more direct regulation of registrants by the SEC may be necessary to mitigate this opportunistic misstatement correction practice.

V. GENERAL DISCUSSION

Conclusions

Although the results of the two experiments differ somewhat and the experiments differed by necessity in timing, administration, and participant pool, they provide consistent answers to our primary research questions. Both experiments support the SEC's concern that some registrants manage earnings by failing to correct quantitatively immaterial earnings overstatements when correction causes the company to miss the consensus forecast. The results are also consistent with archival studies suggesting more general management of earnings toward earnings benchmarks.

SAS No. 89 can be seen as an attempt to increase management's disutility resulting from possible lawsuits and sanctions when known or likely misstatements are not corrected. Our results suggest that SAS No. 89 will not prompt correction of quantitatively immaterial misstatements if the correction causes the company to miss the consensus forecast. Specifically, in experiment 1, where the misstatement magnitude is subjectively determined, SAS No. 89 increases the proportion of companies expected to make corrections, but only in amounts that allow resulting earnings to equal or exceed the forecast. In experiment 2, where misstatement magnitude is objectively determined, SAS No. 89 has no effect on correction behavior.

Direct comparisons of the results of the two experiments should be made with care because of differences in the timing, administration, and participant pool. However, a combined analysis of the two experiments in a single three-way ANOVA reveals that the effects of misstatement type and forecast are highly significant ($p = 0.006$ and $p = 0.002$, respectively), and the main effects of standards and the interactions become insignificant ($p > 0.15$). This combined analysis suggests (1) misstatements are less likely to be corrected if they cause earnings to fall below analysts' forecasts, (2) the new standards have no effect on this phenomenon, and (3) although objectively measured overstatements are more likely to be corrected, if the corrections reduce earnings below forecast, they are still deemed unlikely.

Subsequent Developments

After we conducted experiment 2, the SEC issued Staff Accounting Bulletin (SAB) No. 99, entitled *Materiality* (Securities and Exchange Commission 1999). Although SAB No. 99 is presented as a comprehensive *restatement* of existing standards, it contains specific guidance on the inappropriateness of purely quantitative approaches to materiality assessment, and is the first authoritative guidance to explicitly address the issues examined in this study. Specifically, it states "Among the considerations that may well render material a quantitatively small misstatement of a financial statement item are:

- whether the misstatement arises from an item capable of precise measurement or whether it arises from an estimate and, if so, the degree of imprecision inherent in the estimate...
- whether the misstatement hides a failure to meet analysts' consensus expectations for the enterprise"[17]

along with seven other factors. SAB No. 99 could dramatically affect the behavior exhibited in experiment 2, and to a lesser extent that exhibited in experiment 1, if registrant management applies the SAB (or it is rigorously enforced by their auditor). Its potential effect is reinforced by an August 20, 1999 Financial Executives Institute (FEI) conference call on SAB No. 99 with the SEC Chief Accountant and SEC General Counsel. More than 300 individuals took part in this call. It was thus the best-attended FEI conference call to date, an indication of the level of interest in qualitative materiality within corporate financial management.

SAB No. 99 may enhance the effectiveness of SAS No. 89 because it focuses management and auditors on qualitative materiality factors. Requiring representation letter documentation from management and implicit audit committee approval of immaterial uncorrected misstatements more clearly places responsibility for corrections with management and the board of directors, in addition to the auditors. Future research can compare post-SAB No. 99 results with our pre-SAS No. 89 results and the effect of the ASB's private sector initiative.

Limitations

Differences between Experiments 1 and 2

As noted earlier, direct comparisons between experiments 1 and 2 should be made with care. The difference in administration (classroom vs. mail), the difference in experience level between the two participant groups,[18] and especially the 16-week interval between the conduct of experiments 1 and 2, all limit our ability to directly compare results of the two experiments.

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[17] Our experiment found that overstatement correction was *less* likely if the overstatement would cause a missed forecast. Inclusion of missing the forecast as a special consideration for correction implies that, all else equal, overstatement correction should be *more* likely, not less likely, if correction would cause a missed forecast. This implies that application of SAB No. 99 would not just reduce the behavior exhibited in our study, but also would change the sign of the bias.

When we ran experiment 1, SEC Chairman Levitt's speech had been reported (see MacDonald 1998a, 1998b, 1998c). However, the audit managers still believed that few corrections would be made if correction meant that earnings would miss the forecast, indicating that they were unaware or had not fully realized the implications of those views. For experiment 2, anticipation of increased SEC scrutiny may have dominated the impact of SAS No. 89, leading to the insignificant effect for auditing standards. However, only four audit managers in experiment 2 mentioned SEC scrutiny in their response explanations, and the strong forecast effect in experiment 2 suggests lack of awareness or a small impact. The exposure draft itself was not issued until well after experiment 2 was conducted and no participant indicated knowledge of its impending arrival. So prior knowledge of the exposure draft is not a likely explanation for our results in experiment 2.

The timing difficulties we encountered characterize a more general problem of conducting policy-relevant experiments *ex ante*. Since public announcements of deliberations on proposed regulations inevitably contaminate the relevant participant pools, such experiments are most appropriate when policy-making boards begin considering new issues.[19]

General Limitations

Our experiments made participants aware of current standards or both current and proposed standards. Thus, it is not clear from our results how salient these standards would be in normal practice. In addition, the need to act quickly and our resulting inability to separate the administration of the experimental instrument from the debriefing questionnaire meant that we were unable to conduct typical manipulation tests. In particular, we were unable to assess the salience of qualitative or quantitative materiality and possible differences in judgments of participating auditors. Furthermore, we were unable to ask questions about participants' knowledge of current developments or experience with management's opportunistic correction of earnings or their views on objectivity of measurement as a factor in judging qualitative materiality. Such measures would have been useful in ruling out alternative explanations for our results.

Implications for Additional Research

Our results suggest many avenues for research in accounting measurement, forecasting, regulation, and corporate governance. Here we discuss four extensions and a general implication for conducting *ex ante* policy-evaluation research.

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[18] The differences in experience between the two participant groups, in particular the relative inexperience of participants in experiment 1, are also a concern. To provide some evidence about possible experience effects, we performed two analyses. First, to make the participant samples more similar in experience across the two experiments, we reanalyzed the data after deleting the four managers with less than 2.5 years of assurance services experience from experiment 1 and the 12 managers with more than 10 years of assurance services experience from experiment 2. This reduces the difference in mean experience from 3.6 years to 1.9 years. Results for both experiments are virtually identical. Second, we analyzed the data from each experiment using years of experience in assurance services as a covariate. The covariate is marginally significant ($p = 0.08$) in experiment 1 and is not significant ($p = 0.29$) in experiment 2, and the effects for the experimental treatments are unchanged. The distribution of experience across each of the firm's five industry groupings for the two groups of auditors was very similar across the two experiments. These tests suggest that experience differences do not explain the differences in the effects of the standards between experiments.

[19] Policy-making boards rarely elicit, invite, or commission such studies that might provide insights *ex ante*. To our knowledge, the only *ex ante* policy-evaluating research that the ASB has ever sponsored is research to support possible quantitative materiality guidance for SAS No. 47 (see Warren and Elliott 1986).

First, our study avoided any mention of prior intent by management to manage preaudit earnings. Knowledge of prior intent would likely affect the auditor's evaluation of management integrity and the risk of undetected misstatement, as well as willingness to allow detected misstatements to remain uncorrected. Also, knowledge of management's intent might increase the perceived effectiveness of audit committee communication. On the other hand, prior intent might mean management would be more resistant to correction. Experiments manipulating intent to manage earnings may yield greater insights into the effects of representation and communication regulation.

Second, our results on the limited effectiveness of required management representations and communication of misstatements raise questions about the effectiveness of similar requirements in other corporate governance settings. As an example, Independence Standards Board Standard No. 1 (1999) requires auditors to disclose and discuss with the audit committee all relationships between the auditor and the client. Comparative studies across contexts may yield insight into when audit committee communication regulation will likely be an effective corporate governance tool.

Third, regulators are considering auditor and audit committee evaluation of earnings "quality," "preferability" of accounting choices, and the role of accounting estimates (e.g., Blue Ribbon Committee on Improving the Effectiveness of Corporate Audit Committee 1999, recommendation 8). Our finding that a small accounting estimate misstatement is more likely to remain uncorrected than a data-accumulation misstatement of the same magnitude suggests the need for studies of how audit committee members perceive qualitative materiality and misstatements in accounting estimates. The findings also indicate the possible need for different standards for evaluating and auditing accounting estimates.

Fourth, we considered the first-order effect of regulation on misstatement correction, but we ignored possible second-order effects such as increased management of information provided to financial analysts and less stringency by auditors in aggregating small misstatements. Studies of these possible second-order effects might affect conclusions about SAS No. 89 because they may alter both the need for corrections toward the consensus forecast, and the list of aggregated (and communicated) misstatements.

Finally, the speed with which the exposure draft and adoption of SAS No. 89 proceeded imposed several limitations on our instrument and methods. *Ex ante* policy-evaluation research requires timely availability of proposed policies and access to relevant personnel for testing. Future *ex ante* policy-evaluation research may require a mechanism for timely assemblage of research resources and recognition by those in the editorial-review process of the practical timing and methodological limitations of such research.

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Capital Gains and Dividend Taxes in Firm Valuation: Evidence of Triple Taxation

Julie H. Collins
University of North Carolina at Chapel Hill
Deen Kemsley
Columbia University

ABSTRACT: Although firms account for entity-level taxes, they do not account for shareholder-level capital gains and dividend taxes. To account for these proprietary-level taxes, we add them to a residual-income equity valuation model. Empirical analysis supports the model's predictions. First, both capital gains and dividend taxes reduce investors' implicit valuation of the reinvested portion of earnings. Second, dividend taxes reduce the valuation of the portion of earnings distributed as dividends, but capital gains taxes do not. Third, dividend taxes reduce the valuation of retained earnings equity, but again, capital gains taxes do not. These findings suggest that investors implicitly extend entity-level accounting to the proprietary level when they value the firm. The findings also suggest that when fully accounting for the effects of implicit dividend taxes, reinvested earnings appear to be subject to three levels of taxation—corporate, dividend, and capital gains taxes. Paying earnings out as dividends eliminates the capital gains layer of tax and may provide a net wealth benefit for shareholders, rather than a tax penalty as commonly assumed.

Key Words: *Equity valuation, Capital gains taxes, Dividend taxes, Dividend puzzle.*

Data Availability: *Data used in this study are available from public sources identified in the study.*

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I. INTRODUCTION

Entity-level accounting systems, as well as most empirical valuation studies, abstract from potentially important expenses for many shareholders: proprietary-level capital gains and dividend taxes. If firm value is a function of these taxes, then controlling for them will sharpen predictions regarding the valuation of key entity-level accounting variables, such as book value and earnings, and improve our ability to assess the information content of other accounting measures. In this study, we account for these shareholder-level taxes by adding them to a residual-income equity valuation model and empirically examining the resulting properties. We find that capital gains and dividend taxes have substantial, distinct effects on the valuation of retained and current earnings, as well as on dividends. These findings suggest that proprietary-level taxes drive wedges between entity-level accounting variables and firm value. Accounting for these taxes removes the valuation wedges and helps bridge the gap from entity-level accounting measures to shareholder-level valuation.

This study follows Harris and Kemsley (1999), who take a residual-income approach and provide evidence that future dividend taxes reduce the valuation of retained earnings, which are taxable as dividends upon distribution to shareholders. We extend their study by adding capital gains taxes to their model, and by directly examining the influence of dividend taxes on current earnings, as well as on retained earnings. This more complete model leads to three primary predictions. First, both capital gains and dividend taxes reduce investors' implicit valuation of the reinvested portion of current earnings. Second, dividend taxes reduce the valuation of the portion of earnings distributed as dividends, but capital gains taxes do not. Third, dividend taxes reduce the valuation of existing retained-earnings equity, but again, capital gains taxes do not. Capital gains taxes are not expected to reduce the valuation of existing retained-earnings equity because buyers implicitly pay for the accumulated equity when they purchase stock. By paying for the accumulated equity, buyers establish the tax basis necessary to protect them from future taxes upon eventual sale of the purchased equity.

When considered together, these three predictions from our model could provide a partial explanation for the long-standing dividend puzzle, which asks why investors often reward firms for paying fully taxable dividends rather than allowing them to realize profits through tax-favored capital gains (see Black 1976). Specifically, our model indicates that reinvesting current earnings effectively subjects shareholders to both capital gains and implicit dividend taxes, whereas distributing earnings only subjects shareholders to dividend taxes. Thus, to the extent investors capitalize dividend taxes into share prices, the only incremental effect from distributing earnings, rather than reinvesting the earnings, is to eliminate the capital-gains layer of taxes for shareholders.

All three predictions depend critically on the assumptions underlying our model, especially the assumption that firms will eventually pay out earnings as taxable dividends. Because firms sometimes distribute accumulated earnings to shareholders through nondividend means, including share repurchases, it is crucial to empirically examine the predictions. Therefore, using price per share and market-to-book ratios as dependent variables, we exploit cross-period variation in capital gains and dividend tax rates for a pooled sample of Compustat firms from 1975–1997 to examine our three hypotheses. Consistent with expectations, we find a negative relation between investors' valuation of reinvested current earnings and both capital gains and dividend tax rates over this 23-year period. In addition, we find a negative relation between the valuation of dividends and tax rates on dividends, but not tax rates on capital gains. Also consistent with expectations, we find a negative relation between investors' valuation of retained-earnings equity and dividend tax rates, but not capital gains tax rates.

These empirical results are robust to the inclusion of controls for cross-period variation in interest rates, inflation rates, and firm and year fixed effects, as well as the use of forecasted earnings in lieu of current earnings. The findings suggest that investors capitalize both dividend and capital gains taxes into share prices. Furthermore, the magnitudes of the estimated coefficients for reinvested earnings and dividends suggest that investors do not merely capitalize a weighted average between capital gains and dividend tax rates into prices, as if future earnings will be subject to one type of tax or the other. Rather, the evidence is generally consistent with the hypothesis that capital gains taxes represent a third layer of taxes that investors incur in addition to corporate and full dividend taxes, although at least some of the evidence leaves open the possibility that dividend tax capitalization may be less than complete.

Finding that investors capitalize shareholder taxes into share prices implies that investors implicitly extend entity-level accounting to the proprietary level when they value the firm, by debiting earnings for future shareholder-level capital gains and dividend taxes. That is, the valuation of earnings reflects unreported deferred shareholder-level taxes. Our findings also suggest that raising capital gains or dividend tax rates decreases share prices, thereby imposing the tax burden on existing shareholders. Finally, our results suggest that when fully accounting for the effects of implicit dividend taxes, dividend payouts may provide a net tax benefit for shareholders, rather than a net tax penalty as commonly assumed.

Our paper proceeds as follows. Section II provides background information regarding the valuation of dividend taxes, and Section III adds capital gains taxes to the analysis. Section IV presents the research methodology and empirical results. Section V offers concluding remarks.

II. BACKGROUND: VALUATION OF DIVIDEND TAXES

Many studies examine the links between firm valuation and entity-level accounting measures, like equity and earnings. For example, Ohlson (1995) begins with the dividend discount model, assumes clean surplus among accounting variables, and derives an equity valuation equation essentially equivalent to:

$$P_{it} = BV_{it} + \sum_{\tau=1}^{\infty} \rho_i^{-\tau} E_t[NI_{it+\tau} - (\rho_i - 1)BV_{it+\tau-1}], \tag{1}$$

where:

P_{it} = price per share for firm i at period t,
BV_{it} = the book value of common equity for firm i at period t,
NI_{it} = net income for firm i at period t,
ρ_i = the firm's discount factor (i.e., 1 plus the appropriate discount rate),
E_t = reflects expectations at time t.

Intuitively, equation (1) posits that firm value is a function of the book value of common equity and the present value of the expected stream of future residual income. The equation accounts for corporate-level taxes because both NI and BV are expressed net of corporate tax liabilities. As an entity-level model, however, it does not account for shareholder-level taxes on equity investments.

Dividend Tax Capitalization

Harris and Kemsley (1999) extend equation (1) to the proprietary level by incorporating shareholder-level dividend taxes. Because accumulated retained earnings (RE) are subject to dividend taxes upon distribution to shareholders—whereas contributed capital can be distributed as a tax-free return of capital—they hypothesize that dividend taxes reduce the value of retained earnings below the value of contributed capital. In particular, they derive the following alternative expression of the dividend discount model incorporating dividend taxes:

$$P_{it} = BV_{it} - t_d RE_{it} + \sum_{\tau=1}^{\infty} \rho_i^{-\tau} E_t[(1 - t_d)NI_{it+\tau} - (\rho_i - 1)(BV_{it+\tau-1} - t_d RE_{it+\tau-1})], \quad (2)$$

where t_d represents the dividend tax rate for the marginal investor. Because different investors are subject to different marginal tax rates, Harris and Kemsley (1999) do not attempt to specify t_d for their empirical tests. Instead, they use estimated coefficients for RE to estimate the implicit tax rate for the marginal investor.

Intuitively, equation (2) is equivalent to Ohlson's (1995) original equation (equation (1) above), except Harris and Kemsley (1999) define book value and earnings on an after-dividend-tax basis. In particular, if we let BV* and NI* equal after-dividend-tax measures, so that $BV^* = BV - t_d RE$ and $NI^* = (1 - t_d)NI$, then we can express equation (2) as:

$$P_{it} = BV^*_{it} + \sum_{\tau=1}^{\infty} \rho_i^{-\tau} E_t[NI^*_{it+\tau} - (\rho_i - 1)BV^*_{it+\tau-1}]. \quad (3)$$

Equation (3) has all the same properties as equation (1), except the properties hold on an after-dividend-tax basis. For example, equation (1) follows Miller and Modigliani (1961) by positing that firm value is a function of the pretax value of the portion of equity or future earnings a firm distributes as dividends (D), or $\partial P/\partial D = -1$. Thus, distributing D to shareholders decreases firm value on a dollar-for-dollar basis. Similarly, equation (3) indicates that whether a firm pays dividends from retained earnings or from expected future earnings, $\partial P/\partial D = -(1 - t_d)$, so distributing D decreases firm value by the after-tax value of dividend distributions.

If firm value decreases by the after-tax value of dividend distributions, as suggested by equation (3), then paying dividends does not impose an incremental tax penalty on shareholders. Intuitively, if a firm does not pay dividends to a shareholder while the shareholder holds a share of stock, the shareholder passes the accumulated dividend tax liability on to a buyer who assumes responsibility for the unpaid taxes on retained earnings. If the market implicitly "charges" the seller for the unpaid tax, then the seller pays the dividend tax in the form of a lower sales price for the stock. Regardless of whether a shareholder actually receives dividends, therefore, the shareholder effectively incurs the tax by either explicitly paying it to tax regulators or implicitly paying it to buyers.

Furthermore, equation (3) posits that the timing of dividend payouts does not influence the present value of the total dividend tax on retained earnings whenever reinvested funds generate normal returns, because the tax grows proportionately with the deferral period.

That is, the present value of the dividend tax on distributions from reinvested retained earnings is $t_d (\rho^n RE)/\rho^n = t_d RE$, which is independent of the value for n. Hence, equation (3) posits that investors should capitalize dividend taxes into share prices whether or not a firm pays out any current dividends, as long as investors adopt the crucial assumption that the firm eventually will pay out earnings as fully taxable dividends.[1]

Dividend Tax Capitalization and the Role for Capital Gains Taxes

If investors implicitly incur dividend taxes whenever they sell equity securities, then in contrast to long-standing views (e.g., Black 1976), shareholders do not minimize taxes by realizing profits through tax-favored capital gains rather than realizing profits through highly taxed dividend distributions. Instead, capital gains taxes represent a third layer of tax that investors incur in addition to corporate taxes and shareholder-level dividend taxes.

Viewing the capital gains tax as a third level of tax relies on the assumption that the firm (as a going concern) eventually will pay out earnings as taxable dividends, rather than distributing earnings through share repurchases or other tax-advantaged liquidating distributions. If investors assume that firms eventually will distribute earnings as taxable dividends, then they are assuming that all earnings are eventually subject to the dividend tax. Individual shareholders may avoid paying explicit dividend taxes to the government by selling stock on the secondary market before firms pay out dividends, but these sales do not decrease the total amount of dividend taxes that present and future shareholders expect to eventually pay on a firm's earnings. Dividend tax capitalization ensures that any shareholders who avoid paying explicit dividend taxes, by passing the dividend tax liability onto others, implicitly pay their share of the total dividend tax through share-price effects.

Although selling stock before firms pay out dividends does not allow shareholders to escape the effects of dividend taxation (in the presence of dividend tax capitalization), it triggers capital gains taxes that increase overall taxes for a firm's shareholders over the life of the firm. Given full dividend tax capitalization, therefore, total shareholder taxes do not reflect a weighted average between the tax rates on capital gains and dividends as often assumed. Instead, total taxes reflect taxes on dividends plus taxes on capital gains (for a numerical example, see the Appendix).

Although this property of dividend tax capitalization is contrary to traditional views of dividend taxation, it is not entirely new. Ball (1984) reaches a similar conclusion and argues that governments do not need to impose capital gains taxes on investors to ensure that investors will be taxed on their profits from equity investments. As he concludes, the share-price effects of dividend taxes should ensure that all investors either explicitly or implicitly pay the dividend tax. As our analysis suggests, therefore, the capital gains tax represents an additional layer of tax on investors, not a substitute for the dividend tax.

We now add this additional layer of tax to the model. To do so, we assume that future firm profits will eventually be subject to both dividend taxes and capital gains taxes. However, the resulting empirical equation allows us to distinguish this hypothesis from two viable alternative hypotheses, which are that the marginal investor is a tax-exempt entity, or that investors assume that firm profits will eventually be subject to either dividend taxes or capital gains taxes, but not both.

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[1] This property of equation (3) is consistent with the "trapped equity" view of dividend taxation, as developed by Auerbach (1979a, 1979b), Bradford (1981), and King (1977). Harris and Kemsley (1999) and Harris et al. (1999) both provide evidence that investors generally appear to make this assumption when they price firms.

III. VALUATION OF CAPITAL GAINS TAXES

In contrast to dividend taxes, prior tax-capitalization research provides little theory regarding the potential valuation effects of capital gains taxes. For example, while Auerbach (1979a, 1979b), Bradford (1981), and King (1977) carefully consider the valuation effects of dividend taxes, they focus on only one aspect of capital gains taxes—paying out dividends reduces future capital gains taxes. Because they abstract from capital gains taxes on the reinvested portion of expected future earnings, their models can be construed to lead to the unintuitive result that share prices should increase in capital gains tax rates.[2] On the other hand, other studies assume that share prices should decrease in capital gains tax rates without providing explicit support for this prediction (e.g., Amoako-Adu 1983). In this section, we develop a more complete analysis of the valuation effects of capital gains taxes. We then incorporate these effects in a residual-income model, so unlike prior studies, we can directly link capital gains taxes to the valuation of entity-level accounting variables, such as book value and earnings.

Incorporating Capital Gains Taxes

Unlike dividend taxes, governments assess capital gains taxes on the difference between purchase and sales prices. In addition, capital gains taxes are a function of dividend policy because firms always have the option to decrease share prices and capital gains taxes for their shareholders by paying out dividends. In contrast, the assumptions underlying equation (3) suggest that the tax burden from dividends is independent of current dividend policy. Therefore, to add capital gains taxes to our analysis, we must model the capital gains tax as a function of changes in share prices from purchase dates to sales dates, and then carefully consider the implications for dividend policy.

We begin by identifying the capital gain (or loss) recognized by a shareholder who purchases a share of stock at time t and expects to hold the stock for one period before selling it on the secondary market at time t + 1. In this case, the capital gain equals sales proceeds (P_{it+1}) minus the shareholder's tax basis in the stock (P_{it}), and the present value of the expected capital gains tax (CGT) is:

$$CGT_{it} = \rho_1^{-1}E_t t_g^*(P_{it+1} - P_{it}). \tag{4}$$

In this equation, $t_g^* = t_g/(1 - t_g)$, where t_g is the capital gains tax rate impounded in share prices, which depends on the identity of the marginal investor. At this stage, we do not specify a value for t_g. Dividing t_g by $(1 - t_g)$ to form t_g^* accounts for the fact that P_{it} and P_{it+1} are expected to be a function of capital gains taxes. Specifically, P_{it} and P_{it+1} represent firm value after accounting for capital gains taxes, so dividing t_g by $(1 - t_g)$ grosses up CGT to the tax on pretax proceeds relevant for pricing purposes.[3]

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[2] These models posit that the after-tax value of a dollar of dividends is $(1 - t_d)/(1 - t_g)$ (where t_g is the capital gains tax rate), which implies that the value of dividends increases in the capital gains tax rate. Intuitively, while distributing earnings subjects the earnings to dividend taxes, it also reduces future capital gains taxes (see Zodrow [1991] for a discussion). However, these models are not general valuation equations, because they do not account for the effects of capital gains taxes on the reinvested portion of expected future earnings.

Similarly, Harris et al. (1999) develop a residual-income model positing that all future earnings are a function of the familiar ratio of $(1 - t_d)/(1 - t_g)$. Nevertheless, they impose very restrictive assumptions on their model to obtain this result, abstracting from capital gains for sales of stock on the secondary market, and assuming that firms pay out all retained and future earnings as dividends before any capital gains taxes are incurred. By abstracting from capital gains taxes on reinvested future earnings, their model leads to the undesirable property that where t_g approaches 1, prices approach infinity, and rates of return on investment approach zero.

[3] This gross-up procedure is only approximate because (as discussed later) some determinants of P_{it} and P_{it+1} are not influenced by capital gains taxes.

Next, we assume that at period t, the buyer expects to sell the stock to other investors who will, in turn, hold the stock for a single period before reselling the stock to new investors with the same expectations. In this case, the present value of the tax on all future gains and losses for the stock is:

$$CGT_{it} = \sum_{\tau=1}^{\infty} \rho_i^{-\tau} E_t t_g^{*}(P_{it+\tau} - P_{it+\tau-1}). \tag{5}$$

Assuming that all future investors only expect to hold the stock for a single period simplifies our mathematical expressions. However, this simplification abstracts from the fact that the present value of capital gains taxes should decrease in stock holding periods.[4] As reported later, therefore, we conduct a test to examine the prediction that the influence of capital gains taxes decreases in expected holding periods, as proxied by stock turnover rates.

We now let G_{it} represent the expected present value at time t of all future residual income, or the "economic goodwill" of the firm, so that according to equation (3), $P_{it} = BV^{*} + G^{*}$ and $P_{it+1} = BV^{*}_{it+1} + G^{*}_{it+1}$. Substituting these definitions for price into equation (5) and rearranging terms leads to the following:

$$CGT_{it} = \sum_{\tau=1}^{\infty} \rho_i^{-\tau} E_t t_g^{*}[(BV^{*}_{it+\tau} - BV^{*}_{it+\tau-1}) + (G^{*}_{it+\tau} - G^{*}_{it+\tau-1})]. \tag{6}$$

Equation (6) posits that capital gains are a function of the change in book value and the change in economic goodwill. We can model the change in book value from period t to period t + 1 by assuming that contributed equity remains constant until the shareholder's stock is either sold or redeemed, and by relying on the identity that $RE^{*}_{it+1} = RE^{*}_{it} + NI^{*}_{it+1} - D^{*}_{it+1}$, where $RE^{*} = (1 - t_d)RE$, $NI^{*} = (1 - t_d)NI$, and $D^{*} = (1 - t_d)D$.[5] Given these assumptions, the change in book value equals the amount of earnings reinvested during the shareholder's stock-holding period, or $BV^{*}_{it+1} - BV^{*}_{it} = NI^{*}_{it+1} - D^{*}_{it+1}$. Substituting this identity into equation (6) leads to the following expression of the tax on capital gains:

$$CGT_{it} = \sum_{\tau=1}^{\infty} \rho_i^{-\tau} E_t t_g^{*}[(NI^{*}_{it+\tau} - D^{*}_{it+\tau}) + (G^{*}_{it+\tau} - G^{*}_{it+\tau-1})]. \tag{7}$$

Further simplifying equation (7) requires an assumption regarding the change in economic goodwill, which is a function of several factors including investor expectations. If, for example, we assume that G* is expected to remain unchanged during the holding period (so that $G^{*}_{it+\tau} - G^{*}_{it+\tau-1} = 0$), then the expected capital gains tax is:

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[4] Discounting all future taxes to the present mitigates this effect to some degree. Nevertheless, expected holding periods in excess of a year would still decrease the present value of the capital gains tax below the value expressed by equation (5).

[5] Inferences from the equation would not change if we assumed increases in net contributions of equity (NC), where the incremental equity earns a normal rate of return (so that $\partial P/\partial NC = 1$). In this case, equity contributions would have no impact on the amount of capital gains taxes because aggregate tax basis and firm value would increase by the same amount.

$$\mathrm{CGT}_{it} = \sum_{\tau=1}^{\infty} \rho_i^{-\tau} E_t t_g^* [\mathrm{NI}_{it+\tau}^* - D_{it+\tau}^*]. \tag{8}$$

By assuming that share price decreases by the present value of future capital gains taxes, we can subtract equation (8) from equation (3) to yield the following expression of firm value:

$$P_{it} = \mathrm{BV}_{it}^* + \sum_{\tau=1}^{\infty} \rho_i^{-\tau} E_t[(1 - t_g^*)\mathrm{NI}_{it+\tau}^* + t_g^* D_{it+\tau}^* - (\rho_i - 1)\mathrm{BV}_{it+\tau-1}^*],$$

which is equivalent to:[6]

$$\begin{aligned} P_{it} = \mathrm{BV}_{it} - t_d \mathrm{RE}_{it} + \sum_{\tau=1}^{\infty} \rho_i^{-\tau} E_t[(1 - t_d)(1 - t_g^*)\mathrm{NI}_{it+\tau} + (1 - t_d)t_g^* D_{it+\tau} \\ - (\rho_i - 1)(\mathrm{BV}_{it+\tau-1} - t_d \mathrm{RE}_{it+\tau-1})]. \end{aligned} \tag{9}$$

Finally, by decomposing total income into reinvested net income (RNI) and distributed net income, or dividends, so NI = RNI + D, and by rearranging terms, we can express equation (9) in the following alternative form:[7]

$$\begin{aligned} P_{it} = \mathrm{BV}_{it} - t_d \mathrm{RE}_{it} + \sum_{\tau=1}^{\infty} \rho_i^{-\tau} E_t[\mathrm{RNI}_{it+\tau} - t_d \mathrm{RNI}_{it+\tau} - t_g^*(1 - t_d)\mathrm{RNI}_{it+\tau} \\ + D_{it+\tau} - t_d D_{it+\tau} - (\rho_i - 1)(\mathrm{BV}_{it+\tau-1} - t_d \mathrm{RE}_{it+\tau-1})]. \end{aligned} \tag{10}$$

Although equation (10) relies on the assumption that economic goodwill remains constant during the shareholder's expected holding period, similar equations result from alternative assumptions. For example, assuming goodwill is expected to revert to zero during the shareholder's holding period instead of remaining constant results in an equivalent equation, except that the entire bracketed residual-income term is scaled by $(1 - t_g{}^*)$.

In addition to reflecting capital gains taxes for sales of stock on the secondary market, equation (10) reflects capital gains taxes incurred on other shareholder equity liquidations, including share repurchases, complete liquidations, and certain taxable acquisitions qualifying for capital gains treatment. Like sales of stock on the secondary market, the taxable capital gain resulting from a share repurchase in period t + 1 equals $t_g*(P_{it+1} - P_{it})$. Similarly, in a complete liquidation in period t + 1, gross taxable proceeds are BV_{it+1}, instead of P_{it+1} as posited in equation (4). If we substitute BV_{it+1} for P_{it+1} in equation (4) and simplify, equation (10) results.[8] Unlike sales of stock on the secondary market, however, distributing earnings in capital transactions sometimes allows investors to substitute capital gains taxes for dividend taxes.[9] To the extent investors expect firms to make this substitution, we would not expect them to capitalize dividend taxes into the value of the earnings. Therefore, the magnitude of dividend tax capitalization is an empirical issue.

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[6] Equation (9) indicates that paying dividends provides a capital gains tax benefit for shareholders equal to $(1 - t_d)t_g{}^*$ D, essentially because paying dividends reduces taxable capital gains. The dividend term (D) in equation (9) not only reflects dividends from future earnings, but also reflects dividends from existing retained earnings. Alternatively, we could restrict D to solely reflect dividends from future earnings, and capture the capital gains tax benefit from paying out retained earnings in the RE term. In this case, we would expect the value of retained earnings to increase in t_g, although the effect would be small because only the discounted value of t_g would be relevant. Empirically, as reported later, we find that the estimated coefficient for t_gRE is insignificant and essentially equal to zero.

[7] Because we do not restrict RNI to be positive, equation (10) allows for distributions from retained earnings as well as from expected future earnings. Please also note that we follow Harris and Kemsley (1999) by applying an after-tax discount rate $(\rho - 1)$ to the after-tax values of reinvested earnings and dividends. Alternatively, we could impound the tax effects directly into the discount rates for RNI and D, so $(\rho - 1)^{\mathrm{RNI}} = (\rho - 1)/[(1 - t_d)(1 - t_g{}^*)]$ and $(\rho - 1)^{\mathrm{D}} = (\rho - 1)/(1 - t_d)$. In this case, we would discount pretax RNI and D by $(\rho - 1)^{\mathrm{RNI}}$ and $(\rho - 1)^{\mathrm{D}}$, respectively. In other words, shareholder-level taxes would increase pretax discount rates. Expressing equation (10) in this alternative form does not alter our analysis or empirical investigation.

Properties of the Model

Equation (10) reflects three sets of empirically testable properties. First, both capital gains and dividend taxes reduce investors' implicit valuation of reinvested earnings. Intuitively, if investors assume that firms eventually will pay out earnings as dividends, then equation (10) posits that they will price earnings on an after-dividend-tax basis. In addition, reinvesting earnings raises share prices by the after-dividend-tax value of the reinvestment, which increases capital gains taxes for investors who sell their stock before the earnings are eventually paid out as dividends. Therefore, equation (10) posits that both types of taxes reduce the valuation of reinvested earnings, and when considering these price effects, investors cannot avoid the effects of dividend taxes by merely recognizing profits through capital gains for sales of stock on the secondary market.

Second, while reinvested earnings are subject to both capital gains and dividend taxes, distributed earnings are only subject to dividend taxes. That is, firms eliminate the capital-gains layer of tax for shareholders by distributing dividends. In contrast to the assumptions underlying the long-standing dividend puzzle, therefore, equation (10) posits that paying dividends reduces overall shareholder-level taxes, rather than increasing them (see the numerical example in the Appendix).

Third, dividend taxes reduce the valuation of existing retained-earnings equity, but capital gains taxes do not. Intuitively, dividend taxes reduce the valuation of existing retained earnings for buyers because sellers pass accumulated unpaid dividend taxes for retained earnings onto the buyers. In contrast, selling stock triggers any unpaid capital gains taxes for sellers, so buyers do not inherit accumulated unpaid capital gains taxes. Indeed, by implicitly paying for accumulated retained earnings equity when they purchase stock, buyers establish just enough tax basis in the existing equity to fully protect them from capital gains taxes on the eventual sale of the purchased equity. Buyers do not obtain similar protection from capital gains taxes on reinvested current or future earnings because the subsequent reinvestment of these earnings increases share prices above current purchase prices, resulting in future potential capital gains taxes.

In addition to reflecting these three sets of empirically testable properties, our model reflects three other central sets of properties that we do not empirically examine in this study. First, equation (10) indicates that dividend taxes decrease overall share prices (i.e.,

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[8] Except as in other cases where goodwill reverts to zero, substituting BV_{it+1} for P_{it+1} in equation (4) requires the residual income term to be scaled by $(1 - t_g*)$.

[9] However, liquidations and share repurchases are imperfect substitutes for dividends. In particular, liquidations not only trigger shareholder-level capital gains taxes, but they also trigger corporate taxes on the deemed disposition of corporate assets. Furthermore, tax regulations ensure that firms generally must fund the bulk of their share repurchases from contributed capital, not from retained earnings. Therefore, while share repurchases provide tax-advantaged capital gains treatment for investors who sell their shares, they also reduce the amount of contributed capital which the firm can eventually return tax free to its remaining shareholders. Furthermore, tax rules often restrict the use of share repurchases altogether, and financial accounting rules during our sample period (related to qualifying for pooling accounting for a merger transaction) also can restrict use of share repurchases.

$\partial P/\partial t_d < 0$), primarily because dividend taxes reduce the value of all future earnings. Similarly, equation (10) indicates that capital gains taxes generally decrease share prices (i.e., $\partial P_{it}/\partial t_g^* < 0$), but this negative influence approaches zero as dividend-to-net-income-payout ratios approach 1. In short, equation (10) posits that reducing dividend or capital gains tax rates would generally increase share prices.[10]

Second, the model implies that the marginal investor should be indifferent between selling stock immediately before or immediately after an ex-dividend day. As most easily seen from equation (9), paying out one dollar of retained-earnings equity as a dividend decreases firm value by $(1 - t_d)$, except that the dividend tax is offset by the capital gains tax benefit of paying out the dividend, which is $(1 - t_d)t_g^*$ (where $t_g^* = t_g/(1 - t_g)$). Overall, therefore, firm value decreases by $1 - [t_d - ((1 - t_d)t_g/(1 - t_g))]$. After simplifying, this indicates that firm value should decrease by $(1 - t_d)/(1 - t_g)$ when firms pay out dividends, which is the no-arbitrage condition underlying all ex-dividend-day event studies, including the original study by Elton and Gruber (1970).[11]

Third, the model posits that investors value distributed earnings (D) more highly than reinvested earnings (RNI), so all else equal, firm value should be positively related to expected dividend payouts. When introducing capital gains taxes, therefore, we cannot express the standard dividend discount model solely in terms of book value and earnings variables, as Ohlson (1995) does when abstracting from shareholder-level taxes, or as Harris and Kemsley (1999) do when focusing on dividend taxes alone. Capital gains taxes require us to include a dividend term in the model.

IV. RESEARCH METHOD AND PRIMARY RESULTS

Basic Research Method

To examine the empirical properties of equation (10), we regress price on current equity, retained earnings, earnings, dividends, and tax measures as follows:

$$P_{it} = \alpha_i + \alpha_t + \alpha_1 BV_{it} + \alpha_2 t_d RE_{it} + \alpha_3 RNI_{it} + \alpha_4 t_d RNI_{it} + \alpha_5 t_g^*(1 - t_d)RNI + \alpha_6 D_{it} + \alpha_7 t_d D_{it} + \alpha_8 RR_{it} + \epsilon_{it}, \tag{11}$$

where RR equals the required return, or $(\rho - 1)$ $(BV - t_d RE)$. We proxy for $(\rho - 1)$ by letting it equal the U.S. economy-wide risk-free interest rate for each period.[12] Including both BV and t_dRE in the equation allows us to use separate variables to capture the effects of total common equity (BV) and the potential dividend tax on equity (t_dRE). All variables are scaled by shares outstanding, and as reported below, we also conduct a sensitivity test after scaling all variables by book value.

Equation (11) can be viewed as a linear transformation of equation (10). As Ohlson (1995) shows, transforming a multiperiod equation like equation (10) into a linear specification requires the rather strict assumption that current earnings and dividends adequately proxy for the stream of future earnings and dividends. Because the growth and persistence of future earnings or dividends vary across firms, these proxies introduce measurement error into our regressions. If this measurement error is correlated with our period-specific measures for t_d and t_g^*, it could bias estimated coefficients for the tax variables.[13] As reported later, we conduct sensitivity tests in which we include controls for future earnings and dividend growth, including a set of tests that use analyst forecasts of future earnings in place of current earnings.

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[10] Although we do not directly examine this set of properties, Lang and Shackelford (2000) provide event-study evidence from the 1997 budget reconciliation that is consistent with the prediction that $\partial P_{it}/\partial t_g^* < 0$ for firms with low dividend payouts (i.e., high RNI).

[11] Much of the evidence from the ex-dividend-day studies is consistent with the hypothesis that share prices decline at the rate of $(1 - t_d)/(1 - t_g)$ on ex-dividend days, although some studies find evidence to the contrary. For a detailed analysis of this research from a tax capitalization perspective, see Harris et al. (1999).

[12] Our primary inferences are unaffected if we exclude RR from the equation, or let $(\rho - 1)$ equal the risk-free rate plus 5 or 10 percent. As noted later, our empirical estimations allow for firm fixed effects, to help control for cross-firm variation in discount rates.

As reflected in equation (10), t_d and t_g^* represent the dividend and capital gains tax rates for the marginal investor. *A priori*, it is not possible to identify the marginal investor, who could be a high- or low-tax individual, a tax-exempt institution, a mutual fund that passes tax liabilities directly onto both individual and corporate shareholders, or a corporation that pays at least some entity-level tax on dividends and capital gains before eventually passing the income onto shareholders who pay additional taxes. For this study, therefore, we assume the marginal investor is a high-tax individual, which is suggested by the dividend tax evidence from Harris and Kemsley (1999). That is, we use the top federal individual tax rates for each period to proxy for t_d and t_g, although state taxes could increase t_d and t_g above the federal rates. On the other hand, expected holding periods greater than one year, and the ability to avoid capital gains taxes by passing assets through estates or through certain charitable contributions, could decrease t_g below the federal rate. By using individual tax rates to proxy for tax rates in equation (11), our empirical tests essentially examine the assumption that the marginal investor is a high-tax individual. At the other extreme, if the marginal investor is a tax-exempt entity, then t_d and t_g would equal zero and the tax terms would drop out of equation (11).[14]

In equation (11), $t_d\text{RNI}$ and $t_g^*(1 - t_d)\text{RNI}$ represent the dividend and capital gains taxes on reinvested earnings (the capital gains tax only applies to the after-dividend-tax value of RNI because dividend taxes are expected to dampen the share price appreciation resulting from the reinvestment of earnings). Negative coefficients for these two variables would be consistent with the first empirical property we identified for equation (10), which is that both capital gains and dividend taxes reduce the value of reinvested earnings. t_dD represents the dividend tax on dividend distributions, and $t_d\text{RE}$ represents the accumulated, unpaid dividend tax on equity. Negative coefficients for these variables would be consistent with the second and third empirical properties, which are that dividend taxes reduce investors' valuations of distributed and retained earnings. Including D in equation (11) controls for the signaling and other nontax price effects of dividends, in order to isolate the tax effects of dividends in the t_dD coefficient.

Equation (11) also includes separate intercepts for each year (α_t) and for each firm (α_i). The time-period intercepts control for time-series variation in share prices resulting from the mean effects of omitted variables, including inflation and other macroeconomic factors. The firm-level intercepts control for variation in share prices resulting from the mean effects of cross-firm variation in nontax factors, including growth and risk. Fixing firm-level effects is equivalent to regressing observation-specific deviations from a particular firm's mean value for the dependent variable on deviations from the firm's mean values for each of the explanatory variables. When fixing firm-level effects, therefore, all of the estimated coefficients reflect "within-firm" variation in the explanatory variables.

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[13] For example, many studies find that dividend policy is a function of tax rates on dividends (e.g., Poterba 1987). If so, then the measurement error in our proxies for future RNI and D would be correlated with t_d to at least some degree.

[14] Although firms face the same set of potential investors, it is at least possible that the identity of the marginal investor varies across firms according to existing ownership structure, such as the percentage of institutional shareholdings. However, institutional shareholders include tax-exempt entities, fully taxable corporations, and pass-through entities like mutual funds. Publicly available ownership-structure data is somewhat crude, making it difficult to effectively distinguish among these types of entities. Therefore, we abstract from potential cross-firm variation in t_d and t_g, leaving it for future research.

Although they are not included in equation (10), we also estimate a variation of equation (11) in which we add t_gRE and t_gD to equation (11) as follows:

$$\begin{aligned} P_{it} = {} & \alpha_i + \alpha_t + \alpha_1 BV_{it} + \alpha_2 t_d RE_{it} + \alpha_3 RNI_{it} + \alpha_4 t_d RNI_{it} + \alpha_5 t_g{*}(1 - t_d)RNI \\ & + \alpha_6 D_{it} + \alpha_7 t_d D_{it} + \alpha_8 RR_{it} + \alpha_9 t_g RE_{it} + \alpha_{10} t_g D_{it} + \epsilon_{it}. \end{aligned} \tag{11'}$$

Including t_gRE and t_gD allows us to examine our prediction that while dividend taxes reduce investors' valuations of distributed and retained earnings, capital gains taxes do not. Empirically, however, these two variables are highly correlated with the primary regression variables and increase the effects of multicollinearity to potentially unacceptable levels (the sample correlation between t_gRE and t_dRE is 0.95, and the correlation between t_gD and D is 0.98). Therefore, we do not include them in all of our specifications.

In addition to focusing on the signs of estimated coefficients, we also focus on the magnitudes of the coefficients. If investors fully capitalize both dividend and capital gains taxes into share prices at the top statutory rates according to our assumptions, then we would expect $\alpha_1 = -\alpha_2$, $\alpha_3 = -\alpha_4$, $\alpha_3 = -\alpha_5$, and $\alpha_6 = -\alpha_7$. At the other extreme, if no tax capitalization occurs, then we would expect $\alpha_2 = \alpha_4 = \alpha_5 = \alpha_7 = 0$.

As previously noted, a third possibility is that investors capitalize a weighted average between dividend and capital gains tax rates into share prices, rather than fully capitalizing both sets of taxes into prices as our model posits. For example, investors may weigh expectations according to current dividend payouts, assuming that current dividends will be subject to dividend taxes, and reinvested earnings will only be subject to capital gains taxes. In this case, we would expect to find negative coefficients for $t_g{*}(1 - t_d)$RNI (α_5) and t_dD (α_7), but not for t_dRNI (α_4).

Another possibility is that investors assume that reinvested earnings will be subject to either dividend or capital gains taxes, but not both. Here, we would expect to find negative coefficients for both t_dRNI (α_4) and $t_g{*}(1 - t_d)$RNI (α_5). However, we would generally expect the absolute values of both coefficients to be lower than the estimated RNI coefficient (α_3), so that the sum of the absolute values of the estimated t_dRNI and $t_g{*}(1 - t_d)$RNI coefficients ($|\alpha_4| + |\alpha_5|$) approximately equals the estimated RNI coefficient (α_3).

Variables, Data, and Descriptive Statistics

The original sample for the empirical tests consists of all domestic companies reported on the 1995 or 1998 Compustat primary and research files, which encompass the period 1975 through 1997. The primary variables used in the empirical tests are fiscal-year-end share price (P), reinvested net income (RNI), total common equity (BV), and dividends (D), all on a per-share basis, so observations lacking any of these variables are excluded from the empirical sample.

The predicted tax-valuation effects for firms with negative earnings or book value are not clear, so these observations also are excluded. However, these sample restrictions do not alter inferences. In addition, to mitigate effects of extreme values of price, earnings, book value, or dividends (all scaled by shares outstanding), we eliminated observations in the top 1 percent of the distributions of these variables. We also eliminated 3,878 observations with a studentized residual less than −2 or greater than 2 (this screen does not alter our primary inferences). The remaining sample consists of 68,283 company-year observations.[15]

As reported in Table 1, the highest individual federal tax rate on dividends (t_d) ranges from 0.31 to 0.70 over six separate tax regimes. The highest individual federal tax rate on capital gains (t_g) ranges from 0.20 to 0.35, with three different values over four separate tax-regimes. The third and fourth columns of Table 1 report the total tax on reinvested and distributed net income, respectively, which are based on the assumptions that the marginal investor is a high-tax individual and dividend taxes are fully capitalized into share prices. Specifically, the total tax on reinvested earnings equals $t_d + t_g^*(1 - t_d)$, and the total tax on distributed earnings simply equals t_d. In the 1975–1978 period, Table 1 indicates that investors faced a hefty 86 percent (70 percent) shareholder-level tax rate on corporate reinvested (distributed) net income. The total tax rate steadily declined to 58 percent (31 percent) by the 1991–1992 period, before increasing to 63 percent (40 percent) in 1993. At most, therefore, high-tax investors only realized 42 percent of reinvested after-corporate-tax net income, suggesting that shareholder-level taxes could have an important influence on firm valuation.

Table 2, Panel A provides descriptive statistics for the regression variables. Panel B provides correlations among the variables. Consistent with tax capitalization, share price is

TABLE 1
Statutory Federal Tax Rates from 1975–1997

Period	t_d	t_g	*RNI TAX%:* $t_d + t_g^*(1 - t_d)$	*D TAX%:* $(1 - t_d)$
1) 1975–1978	0.700	0.350	86.0%	70.0%
2) 1979–1981	0.700	0.280	82.0	70.0
3) 1982–1986	0.500	0.200	63.0	50.0
4) 1987	0.385	0.280	62.0	38.5
5) 1988–1990	0.330	0.280	59.0	33.0
6) 1991–1992	0.310	0.280	58.0	31.0
7) 1993–1997	0.396	0.280	63.0	39.6

t_d = the top federal statutory tax rate on dividends,
t_g = the top federal statutory tax rate on long-term capital gains,
$t_g^* = t_g/(1 - t_g)$,
RNI = reinvested net income per share,
D = distributed net income (i.e., common dividends) per share.
RNI TAX% = the total dividend plus capital gains tax rate, which is based on the assumptions that the marginal investor is a high-tax individual and dividend taxes are fully capitalized into share prices, and
D TAX% = the dividend tax rate.

The 0.33 dividend tax rate for the fifth tax regime only applies to certain ranges of taxable income, before dropping to 0.28 for taxable income above specified thresholds. Empirical results are not materially sensitive to our choice of tax rate for this regime.

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[15] The sample size for market-to-book tests is 67,824 observations.

TABLE 2
Descriptive Statistics and Correlations among Regression Variables
68,283 Observations

Panel A: Mean and Median Statistics for the Pooled Sample from 1975–1997

	Mean	*First Quartile*	*Median*	*Third Quartile*	*Standard Deviation*
P	17.88	8.25	15.63	25.00	12.36
t_d	0.49	0.40	0.50	0.70	0.14
t_g	0.27	0.20	0.28	0.28	0.05
BV	13.31	5.40	10.31	18.34	10.80
RE	8.23	1.99	5.42	11.52	8.66
RNI	1.42	0.49	1.05	1.94	1.36
D	0.27	0.00	0.00	0.21	0.55
RR	0.63	0.24	0.45	0.82	0.59

Panel B: Pearson **(Spearman)** *Correlations*

	P	t_d	t_g	*BV*	*RE*	*RNI*	*D*	*RR*
P	—	−0.06	−0.06	0.69	0.64	0.66	0.41	0.55
t_d	**−0.03**	—	0.30	0.21	0.23	0.26	0.09	0.20
t_g	**−0.05**	**0.15**	—	0.06	0.05	0.08	0.01	−0.15
BV	**0.70**	**0.20**	**0.09**	—	0.90	0.72	0.47	0.86
RE	**0.63**	**0.24**	**0.09**	**0.87**	—	0.69	0.39	0.69
RNI	**0.66**	**0.25**	**0.11**	**0.70**	**0.69**	—	0.12	0.61
D	**0.37**	**0.04**	**0.03**	**0.42**	**0.38**	**0.12**	—	0.44
RR	**0.62**	**0.20**	**−0.11**	**0.90**	**0.72**	**0.61**	**0.37**	—

All correlations are statistically significant at the 0.05 level.

P = fiscal year-end price per share,

t_d = the top federal statutory tax rate on dividends,

t_g = the top federal statutory tax rate on long-term capital gains,

BV = book value of shareholders' equity per share,

RE = retained earnings per share,

RNI = reinvested net income per share,

D = distributed net income (i.e., common dividends) per share, and

RR = the required return for firm i at period t, or $r(BV - t_d\ RE)$, where r is the risk-free interest rate.

negatively correlated with the dividend tax rate (−0.06, p = 0.01) and the capital gains tax rate (−0.06, p = 0.01) (Pearson correlations), but many nontax factors could contribute to this univariate result. Therefore, we now turn to the multivariate tests.

Primary Empirical Results

Table 3, column (1), provides benchmark results from regressing price on BV, RNI, D, and RR, without including the tax variables from equation (11). As reported, the estimated BV coefficient is 0.54 ($t = 64.9$), the estimated RNI (3.52, $t = 118.0$) and D (3.32, $t = 32.6$) coefficients are not statistically different from each other at the 0.05 level, and the estimated RR coefficient is -4.10 ($t = -32.4$).

Table 3, column (2) reports results after adding the shareholder tax variables from equation (11). The estimated coefficients for BV, RNI, and D are 0.86 ($t = 65.9$), 8.78 ($t = 49.5$), and 7.70 ($t = 44.5$), respectively. Consistent with the implications of equation (10), the estimated coefficients are negative for t_dRE (-0.55, $t = -26.9$), t_dRNI (-7.91, $t = -40.1$), $t_g*(1 - t_d)$RNI (-5.03, $t = -10.2$), and t_dD (-7.54, $t = -25.2$). These negative coefficients are consistent with the predictions that dividend taxes reduce the valuation of retained-earnings equity, reinvested current earnings, and dividends, and that capital gains taxes reduce the valuation of reinvested earnings.

Furthermore, the absolute value of the estimated t_dRNI coefficient is not statistically different from the estimated RNI coefficient at the 0.05 level, and the absolute value of the estimated t_dD coefficient is not statistically different from the estimated D coefficient. These results suggest that investors fully capitalize future dividend taxes into the values of RNI and D, rather than assuming that only a portion of reinvested earnings or dividends will be subject to the tax. Moreover, the sum of the absolute values of estimated t_dRNI and $t_g*(1 - t_d)$RNI coefficients is statistically greater than the estimated RNI coefficient at the 0.05 level, suggesting that reinvested earnings are subject to both dividend and capital gains taxes, not just to one layer of tax or the other. Similarly, the sum of the absolute values of the estimated t_dRNI and $t_g*(1 - t_d)$RNI coefficients is greater than the absolute value of the estimated t_dD coefficient, implying that reinvested earnings are subject to more overall taxes than distributed earnings.

When focusing on capital gains taxes alone, the estimated $t_g*(1 - t_d)$RNI coefficient is significantly lower than the estimated RNI coefficient and suggests that investors capitalize approximately 57 percent of the federal capital gains tax rate into prices (in addition to dividend taxes). Incomplete capitalization of capital gains taxes could arise because some shareholders hold their stock for more than a year, and other investors avoid the capital gains tax altogether through charitable donations of appreciated property, or by passing shares through estates.

The only indication that investors may not fully capitalize dividend taxes into share prices is that the magnitude of the estimated t_dRE coefficient is lower than the estimated BV coefficient (the difference is statistically significant at the 0.05 level). This could suggest that investors do not expect firms to eventually pay out all retained earnings as taxable dividends. On the other hand, any uncontrolled nontax relation between price and RE could bias the estimated t_dRE coefficient. Indeed, when adding RE as a separate control variable to the regression, the absolute value of the estimated t_dRE is no longer statistically different from the estimated BV coefficient. However, the result from this sensitivity test is not reliable because adding RE introduces potentially severe multicollinearity into our estimates. Given the ambiguity associated with this multicollinearity, we cannot definitively conclude that investors fully capitalize dividend taxes into share prices, leaving open the possibility that investors may expect firms to distribute at least some equity through nondividend means, including share repurchases or other liquidating distributions.

When comparing the results in Table 3 Columns (1) and (2), it becomes evident that shareholder taxes substantially depress the estimated coefficients for book value, earnings,

TABLE 3
Fixed-Effects Regression of Price on Book Value, Earnings, Dividends, and Taxes per Share from 1975–1997
68,283 Observations: Estimated Coefficients (t-statistics)

$$P_{it} = \alpha_i + \alpha_t + \alpha_1 BV_{it} + \alpha_2 t_d RE_{it} + \alpha_3 RNI_{it} + \alpha_4 t_d RNI_{it} + \alpha_5 t_g{}^*(1 - t_d)RNI + \alpha_6 D_{it} + \alpha_7 t_d D_{it}$$
$$+ \alpha_8 RR_{it} + \alpha_9 t_g RE_{it} + \alpha_{10} t_g D_{it} + \epsilon_{it}$$

Variable	*(1) No Tax Variables*	*(2) Add Shareholder Taxes*	*(3) Add Other Variables*
BV	0.54	0.86	0.84
	(64.9)	(65.9)	(58.4)
t_dRE	—	−0.55	−0.55
(−)		(−26.9)	(−18.3)
RNI	3.52	8.78	8.91
	(118.0)	(49.5)	(47.0)
t_dRNI	—	−7.91	−8.05
(−)		(−40.1)	(−40.2)
$t_g{}^*(1 - t_d)$RNI	—	−5.03	−5.36
(−)		(−10.2)	(−9.4)
D	3.32	7.70	5.98
	(32.6)	(44.5)	(25.4)
t_dD	—	−7.54	−8.69
(−)		(−25.2)	(−26.0)
RR	−4.10	−6.16	−5.77
	(−32.4)	(−44.5)	(−39.9)
t_gRE	—	—	0.05
			(0.9)
t_gD	—	—	8.79
			(10.1)
R^2	0.84	0.86	0.86

P = fiscal year-end price per share,
t_d = the top federal statutory tax rate on dividends,
t_g = the top federal statutory tax rate on long-term capital gains,
$t_g{}^* = t_g/(1 - t_g)$,
BV = book value of shareholders' equity per share,
RE = retained earnings per share,
RNI = reinvested net income per share,
D = distributed net income (i.e., common dividends) per share, and
RR = the required return for firm i at period t, or r(BV − t_d RE), where r is the risk-free interest rate.

The t_dRE, t_dRNI, and $t_g{}^*(1 - t_d)$RNI variables represent the dividend tax on retained earnings, the dividend tax on reinvested current earnings, and the capital gains tax on reinvested current earnings, respectively. Negative coefficients for these variables are consistent with the hypothesis that investors capitalize these taxes into share prices.

t-tests indicate that the absolute value of the estimated t_dRE coefficient is statistically lower than the estimated BV coefficient at the 0.05 level in both column (2) and column (3), and the absolute value of the estimated t_dD coefficient is significantly larger than the estimated D coefficient in column (3). In addition, the estimated $t_g{}^*(1 - t_d)$ RNI coefficients are significantly lower than the estimated RNI coefficients. However, the estimated t_d RNI coefficients are not statistically different from the estimated RNI coefficients in either column (2) or column (3), and the estimated t_dD coefficient is not statistically different from the estimated D coefficient in column (2). Furthermore, the sum of the absolute values of the t_dRNI and $t_g{}^*(1 - t_d)$RNI coefficients is greater than the absolute value of the RNI coefficient.

and dividends in Column (1). In particular, controlling for shareholder taxes raises the estimated BV coefficient from 0.54 to 0.86, raises the estimated RNI coefficient from 3.52 to 8.78, and raises the estimated D coefficient from 3.32 to 7.70. Therefore, accounting for shareholder taxes has the potential to alter inferences from firm-valuation research concerned with the magnitudes of estimated book value, earnings, earnings components, or dividend coefficients.

As reported in Table 3 Column (3), adding t_gRE and t_gD to our regression as in equation (11′) does not materially alter the estimated BV, t_dRE, RNI, t_dRNI, or t_g*(1 − t_d)RNI coefficients, although it does decrease the estimated D coefficient to 5.98 (t = 25.4) and raise the magnitude of the estimated t_dD coefficient to −8.69 (t = −26.0). Furthermore, the estimated t_gRE coefficient is 0.05 (t = 0.9) and the estimated t_gD coefficient is 8.79 (t = 10.1), so in contrast to dividend taxes (and as predicted), capital gains taxes do not appear to reduce the values of retained earnings and dividends.

Nevertheless, the estimated coefficients in Table 3 Column (3) should be viewed with caution because adding the two variables introduces potentially unacceptable levels of multicollinearity into the regression. Specifically, adding the variables increases the condition index from 27 to 63, and according to Kennedy (1993), a condition index of 30 or more indicates the presence of strong multicollinearity. It is possible, for example, that multicollinearity contributes to the difference between the estimated D coefficients in Column (2) and Column (3), and it could contribute to the otherwise inexplicably large positive coefficient for t_gD in Column (3). On the other hand, adding t_gRE and t_gD does not materially affect the estimated BV, RE, RNI, and RR coefficients, so it is less likely that multicollinearity affects inferences for these variables.

V. ROBUSTNESS TESTS

To further examine the tax interpretation for our primary findings, we conduct four sets of general sensitivity tests. We also conduct tests to control for cross-firm variation in the growth of earnings and dividends, including the use of I/B/E/S analyst forecast data. In addition, we examine the prediction that the valuation effects of future capital gains taxes vary according to expected holding periods.

General Sensitivity Tests

First, to control for potentially spurious scaling effects and to provide a check for the effects of heteroskedasticity, we estimate equation (11) after scaling all variables by the book value of common equity. When doing so, the estimated coefficients for key variables are: t_dRE/BV: −0.54, t = −8.1; RNI/BV: 14.71, t = 39.2; t_dRNI/BV: −11.93, t = −28.2; t_g*(1 − t_d)RNI/BV: −15.50, t = −15.6; D/BV: 12.82, t = 39.7; t_dD/BV: −14.19, t = −22.2. Therefore, scaling the regression variables by book value does not alter the signs of the tax coefficients. Unlike the primary results, however, the absolute value of the estimated t_d RNI/BV coefficient is statistically lower than the estimated RNI/BV coefficient at the 0.05 level, suggesting that dividend tax capitalization may not be complete. On the other hand, the absolute value of the estimated t_g*(1 − t_d)RNI /BV coefficient is not statistically different from the estimated RNI/BV coefficient, suggesting full capitalization of capital gains taxes.

Second, cross-period variation in interest and inflation rates could influence profitability and growth in earnings, as well as discount rates. Therefore, to ensure that cross-period variation in interest and inflation rates do not alter inferences, we interact annual risk-free interest rates and inflation rates with RNI and D and add these interactions to equation

(11). When doing so, we find that the estimated coefficients of interest remain essentially the same.

Third, we estimate equation (11) for a sample of balanced panel data that only includes firms present on Compustat for the entire sample period. Because the primary sample includes firms that enter and/or drop out of Compustat during the sample period, the composition of the sample varies across tax regimes and could influence estimation of the tax effects (although fixing firm-level effects mitigates this concern). The total number of observations available for this test is 8,795, and focusing on this subsample of firms does not alter the signs of key estimated coefficients. Specifically, key estimated coefficients are: BV: 0.93, $t = 27.9$; t_dRE: −0.74, $t = -14.8$; RNI: 8.79, $t = 16.5$; t_dRNI: −7.94, $t = -13.4$; $t_g{*}(1 - t_d)$RNI: −3.74; $t = -2.6$; D: 7.66, $t = 22.9$; t_dD: −5.60, $t = -9.6$.

Fourth, Table 1 indicates that when considering capital gains and dividend taxes together, total shareholder tax rates vary over seven different tax regimes. To examine tax effects across regimes, we estimate the following equation, in which we allow the RNI and D coefficients to vary by tax regime:[16]

$$P_{it} = \alpha_t + \alpha_1 BV_{it} + \alpha_2 t_d RE_{it} + \alpha_{3t} RNI_{it} + \alpha_{4t} D_{it} + \alpha_{5t} RR_{it} + \epsilon_{it}. \tag{12}$$

All else equal, we expect the valuation of RNI to decrease in total dividend and capital gains taxes on RNI (RNI TAX%), and we expect the valuation of D to decrease in dividend taxes (D TAX%).

As reported in Table 4, results from this test are largely consistent with expectations, especially when focusing on contiguous tax regimes. Specifically, the estimated RNI coefficient increases significantly from the second to the third tax regimes, from 3.81 to 5.06 ($t = 86.0$), as RNI TAX% drops from 82 percent to 63 percent. The estimated RNI coefficient then continues to edge upward from the fourth through the sixth tax regimes as RNI TAX% gradually drops to 58 percent. Finally, as RNI TAX% increases from 58 percent to 63 percent from the sixth to the seventh tax regimes, the estimated RNI coefficient drops from 6.29 ($t = 51.5$) to 6.03 ($t = 90.5$). Similarly, the value of distributed earnings generally rises as the tax rate on dividends decreases (although it unexpectedly declines from the first to the second regime), and the value of D declines from the sixth to the seventh periods as the D TAX% increases.

When focusing on contiguous tax regimes, the cross-tax regime evidence is generally consistent with a tax explanation for the primary empirical results. The results are less clear when comparing estimated coefficients across distant tax regimes. For example, the estimated RNI coefficient is higher in the seventh tax regime (6.03) than it is in the fifth tax regime (5.53), even though the tax rate for RNI is greater for the seventh regime than it is for the fifth regime.

Controlling for Growth

As previously discussed, our linear estimation model relies on the assumption that current earnings and dividends adequately proxy for the expected stream of future earnings and dividends. By making this assumption, we do not directly control for cross-firm variation in expected growth of earnings or dividends (although fixing firm effects controls for

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[16] We do not control for firm-fixed effects in this specification, because we estimate separate coefficients within each tax regime. As a within-firm estimation technique, effective use of firm-fixed effects would require multiple observations per firm for each tax regime. However, the fourth tax regime only includes one observation per firm, and other regimes only include two or three observations per firm.

TABLE 4
Fixed-Effects Regression of Price on Book Value, Earnings, Dividends, and Taxes per Share from 1975–1997 by Tax Regime
68,283 Observations: Estimated Coefficients (t-statistics)
$R^2 = 0.70$

$$P_{it} = \alpha_i + \alpha_1 BV_{it} + \alpha_2 t_d RE_{it} + \alpha_{3t} RNI_{it} + \alpha_{4t} D_{it} + \alpha_{5t} RR_{it} + \epsilon_{it}$$

Tax Regime	*Tax Rates for Reinvested Earnings (RNI) and Dividends (D)*	*Estimated RNI Coefficients (t-statistics)*	*Estimated D Coefficients (t-statistics)*
1) 1975–1978	RNI TAX% = 86%	3.77	6.40
	D TAX% = 70%	(60.3)	(47.0)
2) 1979–1981	RNI TAX% = 82%	3.81	4.76
	D TAX% = 70%	(65.2)	(37.2)
3) 1982–1986	RNI TAX% = 63%	5.06	5.94
	D TAX% = 50%	(86.0)	(54.6)
4) 1987	RNI TAX% = 62%	5.21	7.00
	D TAX% = 38.5%	(33.4)	(24.6)
5) 1988–1990	RNI TAX% = 59%	5.53	7.50
	D TAX% = 33%	(62.3)	(44.9)
6) 1991–1992	RNI TAX% = 58%	6.29	9.09
	D TAX% = 31%	(51.5)	(45.0)
7) 1993–1997	RNI TAX% = 63%	6.03	7.48
	D TAX% = 39.6%	(90.5)	(41.7)

All estimated coefficients are statistically different from each other at the 0.05 level, except for the estimated RNI coefficients in the first and second tax regimes.

P = fiscal year-end price per share,
t_d = the top federal statutory tax rate on dividends,
t_g = the top federal statutory tax rate on long-term capital gains,
BV = book value of shareholders' equity per share,
RE = retained earnings per share,
RNI = reinvested net income per share,
D = distributed net income (i.e., common dividends) per share,
RR = the required return for firm i at period t, or $r(BV - t_d\ RE)$, where r is the risk-free interest rate,
RNI TAX% = the total dividend plus capital gains tax, which is based on the assumptions that the marginal investor is a high-tax individual and dividend taxes are fully capitalized into share prices, and
D TAX% = the dividend tax rate.

mean differences in growth across firms). Therefore, we employ two sets of tests to control for the effects of growth.

First, we add NI_{t+1}, NI_{t+2}, D_{t+1}, and D_{t+2} as controls for future growth in earnings and dividends and then estimate equation (11). Here we find that including these controls for realized growth in earnings and dividends does not materially influence any of the other regression coefficients.

Second, we use consensus analyst one-year-ahead and two-year-ahead earnings forecasts from I/B/E/S to proxy for the expected stream of future earnings, rather than using current earnings to proxy for expected future earnings. Specifically, we replace RNI with RNI*, which we define as either the one-year-ahead or two-year-ahead consensus earnings forecast, less estimated future dividends (D*). We also replace dividends with D*. Because analysts generally do not estimate future dividends, we let estimated dividends equal the current dividend payout ratio times forecasted earnings (which assumes a constant dividend payout). This estimate for expected future dividends introduces measurement error into our regressions, and using the one-year-ahead (two-year-ahead) earnings forecasts decreases the sample size from 68,283 observations to 23,547 (18,152) observations. Nevertheless, using forecasted earnings in lieu of current earnings allows us to more explicitly control for cross-firm variation in expected near-term growth.

Using either the one-year-ahead or two-year-ahead earnings forecasts, we find that the estimated t_dRE, t_dRNI*, $t_g^*(1 - t_d)$RNI*, and t_dD* coefficients all are negative and significant at the 0.10 level. Specifically, the estimated coefficients when using the one-year-ahead forecasts are: BV: 1.20, t = 37.8; t_dRE: −0.80, t = −12.4; RNI*: 10.78, t = 5.7; t_dRNI*: −9.57, t = −3.3; $t_g^*(1 - t_d)$RNI*: −12.00, t = −3.3; D*: 5.97, t = 14.6; t_dD*: −6.30, t = −6.4; RR: −8.12, t = −21.9. The estimated coefficients when using the two-year-ahead forecasts are: BV: 1.46, t = 34.9; t_dRE: −0.82, t = −9.1; RNI*: 9.88, t = 2.5; t_dRNI*: −11.19, t = −2.0; $t_g^*(1 - t_d)$RNI*: −20.71, t = −1.8; D*: 1.29, t = 3.4; t_dD*: −3.56, t = −3.7; RR: −7.46, t = −15.2. Empirically, therefore, using forecasted earnings leads to the same primary inferences as using current earnings, which is that investors appear to capitalize both dividend and capital gains taxes into share prices. However, the relatively small samples for these analyst forecast tests magnify the potential effects of multicollinearity. In addition, future dividend payouts may be correlated with tax rates. Therefore, caution should be exercised when interpreting the estimated coefficients from these tests.

Expected Holding Periods

Finally, we examine the influence of expected holding periods on the valuation effects of capital gains taxes. The present value of capital gains taxes should decrease in expected holding periods. All else equal, expected holding periods likely are negatively related to stock turnover rates (i.e., annual trading volume divided by shares outstanding). Therefore, we expect the absolute value of the $t_g^*(1 - t_d)$RNI coefficient to increase in stock turnover rates. That is, we expect the valuation effects of capital gains taxes to be greatest among firms whose investors, on average, appear to have relatively short expected holding periods, as proxied by high stock turnover rates.

To examine this prediction, we create a 0,1 indicator variable for each quartile of stock turnover in our sample, and we then interact the four indicator variables with $t_g^*(1 - t_d)$RNI (as well as RNI and t_dRNI for control purposes). We then replace $t_g^*(1 - t_d)$RNI with these interaction terms and reestimate equation (11). Consistent with expected tax effects, the absolute value of the $t_g^*(1 - t_d)$RNI coefficients increase in stock turnover rates. Specifically, the estimated $t_g^*(1 - t_d)$RNI coefficients for the different quartiles of stock turnovers are: Lowest quartile: −2.71, t = −4.4; second quartile: −4.16, t = −4.9; third quartile: −7.24, t = −8.8; highest quartile: −7.98, t = −9.7. As expected, the monotonic pattern in estimated coefficients according to stock turnover rates is unique to the estimated t_gRNI coefficient.[17] No clear monotonic pattern emerges for the estimated RNI and t_dRNI coefficients across the quartiles of stock turnover rates.[18]

VI. SUMMARY AND CONCLUSIONS

In this study, we find that capital gains and dividend taxes both reduce the valuation of the reinvested portion of earnings. In contrast, we find that dividend taxes reduce the valuation of earnings distributed as dividends, but capital gains taxes do not. We also find that dividend taxes alone reduce the valuation of retained-earnings equity. Hence, the evidence suggests that at least some entity-level accounting measures cannot be mapped directly into firm value without accounting for proprietary-level taxes. These findings may have implications for research inferring information content from the correlation between stock prices and accounting measures. In particular, closing the gap between accounting measures and valuation by controlling for unreported deferred shareholder-level taxes should sharpen our focus on any remaining wedges between financial disclosures and firm valuation.

When considering dividend and capital gains taxes together, our findings provide the first evidence that dividends may provide a net tax benefit for shareholders, not a net tax penalty as commonly assumed. In particular, our evidence suggests that dividend taxes are largely capitalized into share prices. To the extent dividend taxes are capitalized into share prices, shareholders incur dividend taxes whether or not the firm pays out dividends while they hold shares. That is, if a shareholder does not pay dividend taxes directly to tax regulators, the shareholder implicitly pays the tax by selling the stock for a tax-discounted price. Thus, the only incremental tax effect of paying dividends is to reduce taxes on capital gains, so, all else being equal, managers could enhance firm value by paying dividends whenever the firm's profitable investment opportunities have been exhausted.

Nevertheless, at least some of our findings should be interpreted cautiously. First, although the estimated magnitudes of our coefficients generally suggest that investors fully capitalize dividend taxes into share prices, some of our estimates suggest that dividend tax capitalization may not be complete. Second, while we employ numerous controls and sensitivity tests, our experimental approach relies on somewhat limited variation in dividend and capital gains tax rates from 1975–1997. This limited variation results in a fairly high degree of collinearity among regression variables, which could influence inferences. Third, our approach relies on all of the assumptions underlying any residual-income analysis, including the assumption that firm value can be characterized as a function of book value and a capitalized stream of future abnormal earnings. In addition, we rely on a variety of simplifying assumptions necessary to transform our multiperiod residual-income model into a linear empirical specification, and to incorporate tax variables in a tractable manner.

Given these limitations, we do not consider our evidence conclusive. Rather, this study provides initial evidence that investors may incur capital gains taxes *in addition to* dividend taxes, rather than incurring capital gains taxes *in lieu of* dividend taxes. Because this result fundamentally alters the parameters of the dividend policy debate and implies that true tax rates on equity investment may be quite high, we believe researchers should continue to investigate the capitalization of both capital gains and dividend taxes, using alternative research designs and approaches. Firm conclusions should be deferred until more evidence is collected. In the meantime, however, this and other recent studies provide consistent evidence that shareholder-level taxes significantly affect the valuation of entity-level accounting measures.

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[17] The estimated $t_g*(1 - t_d)$RNI coefficients for the third and fourth quartiles are not statistically different from each other at the 0.05 level, but they both are statistically different from the estimated $t_g*(1 - t_d)$RNI coefficients for the first and second quartiles.

[18] The estimated RNI coefficients are: lowest quartile: 8.90, $t = 39.9$; second quartile: 7.84, $t = 27.5$; third quartile: 8.71, $t = 30.5$; highest quartile: 8.23, $t = 26.9$. The estimated t_dRNI coefficients are: lowest quartile: −8.74, $t = -36.2$; second quartile: −6.95, $t = -22.5$; third quartile: −7.54, $t = -23.8$; highest quartile: −5.61, $t = -15.9$.

APPENDIX

This appendix uses a numerical example to illustrate that if a firm eventually distributes its retained-earnings equity as taxable dividends, then capital gains taxes for sales of stock on the secondary market are not a substitute for dividend taxes. Rather, capital gains taxes represent an additional layer of tax.

Assume shareholders invest \$1,000 in a firm, and after corporate taxes, the firm earns a 10 percent return on the investment, which also is equal to the after-tax discount rate. Also assume that the investment horizon is 20 years, the dividend tax rate is a constant 40 percent, and the capital gains tax rate is 20 percent. If the firm pays out all earnings as taxable dividends each year, then the present value of the \$40 annual dividend tax for 20 years would be \$341. On the other hand, if the firm reinvests its annual earnings for the 20 years before paying dividends, total equity would grow to \$6,727, which would include \$5,727 of retained earnings. If the firm then paid out all \$5,727 of its retained earnings as a taxable dividend, the dividend tax would be \$2,292, and the present value of the tax would \$341, which is identical to the case in which the firm pays out annual dividends. Under these assumptions, therefore, the timing of dividend payouts does not influence the present value of the dividend tax.

Further assume that while the firm is reinvesting its annual earnings, shareholders sell their stock on the secondary market at the end of each year. Reinvesting normal earnings would increase share prices, so selling shareholders would incur capital gains taxes each year. Specifically, if all else were constant, the annual capital gain would equal $(1 - t_d)$ times the amount of reinvested earnings each year. However, even though investors incur capital gains taxes each year, the firm would still have \$5,727 of retained earnings to pay out as a dividend in year 20, which would still trigger the \$2,292 of dividend taxes with a present value of \$341. In addition to this dividend tax, the present value of taxes on all capital gains and losses (there would be a capital loss in year 20 after the firm pays out the dividend) would be \$116, resulting in total shareholder taxes of \$457 (\$341 + \$116). Under these assumptions, therefore, paying annual dividends decreases the present value of total shareholder taxes from \$457 to \$341, implying that paying dividends provides a net tax benefit for investors, not a tax penalty as commonly assumed.

Nevertheless, this example critically hinges on our assumption that the firm eventually pays out earnings as taxable dividends, rather than paying out the earnings through share repurchases or through a liquidation taxed as a capital gain. Therefore, it becomes an empirical issue to examine the hypothesis that investors capitalize both dividend and capital gains taxes into prices according to this assumption.

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An Experimental Investigation of Auditors' Liability: Implications for Social Welfare and Exploration of Deviations from Theoretical Predictions

Ronald R. King
Rachel Schwartz
Washington University

ABSTRACT: This paper reports the results of an experiment designed to investigate how legal regimes affect social welfare. We investigate four legal regimes, each consisting of a liability rule (strict or negligence) and a damage measure (out-of-pocket or independent-of-investment). The results of the experiment are for the most part consistent with the qualitative predictions of Schwartz's (1997) model; however, subjects' actual choices deviate from the point predictions of the model. We explore whether these deviations arise because: (1) subjects form faulty anticipations of their counterparts' actions and/or (2) subjects do not choose the optimal responses given their anticipations. We find that subjects behave differently under the four regimes in terms of anticipation errors and departures from best responses. For example, subjects playing the role of auditors anticipate investments most accurately under the regime with strict liability combined with out-of-pocket damages, but are least likely to choose the optimal response given their anticipations. This finding implies that noneconomic factors likely play a role in determining subjects' choices.

Key Words: *Audit quality, Damage measures, Liability rules, Social welfare, Anticipation and best response, Experimental economics.*

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Data Availability: *Data are available upon request from the authors.*

I. INTRODUCTION

This paper reports the results of an experiment designed to test Schwartz's (1997) model that analyzes audit quality, investment, and social welfare. She models a two-person strategic auditing game in which an auditor selects audit quality and an investor selects an investment amount. The combination of audit quality and investment determines social welfare. Legal regimes are constructed by combining a liability rule with a damage measure. Liability rules determine the probability that an audit triggers liability in court (i.e., when the auditor must pay damages). Damage measures determine the amount of financial compensation auditors must pay if liability is triggered (i.e., how much must be paid).

Our experiment builds on Schwartz's (1997) model in two ways. First, we test her predictions by investigating four legal regimes that correspond to the regimes she models: a strict liability rule combined with an out-of-pocket damage measure (denoted Strict/OOP); a negligence liability rule combined with an out-of-pocket damage measure (denoted Negligence/OOP); a strict liability rule combined with an independent-of-investment damage measure (denoted Strict/IOI); and finally a negligence liability rule combined with a damage measure that is independent of the actual investment (denoted Negligence/IOI). Schwartz's (1997) model predicts that social welfare under a Strict/OOP regime will be lower than under the other three regimes because this regime induces excessive investment on the part of investors and overauditing on the part of auditors.

Previous experimental research has shown subjects often deviate from economic predictions (Bloomfield 1997; Dopuch et al. 1997; Kachelmeier 1991). Therefore, our second objective is to investigate causes of any deviations from predictions. Specifically, we investigate whether deviations of subjects' actual choices from the model's predictions arise because (1) subjects form faulty anticipations of their counterparts' actions (i.e., subjects do not anticipate accurately), and/or (2) subjects choose actions that do not maximize their expected wealth, given their anticipation of their counterparts' actions (i.e., subjects do not best respond to anticipations).[1]

We test Schwartz's (1997) model (hereafter Schwartz's model) for two primary reasons. First, models that have been subjected to empirical scrutiny and found to have predictive validity may be more likely to influence policy debates. Second, empirical evidence on the descriptive validity of theories can help theorists revise models to incorporate empirical findings that are not consistent with the model's predictions (Smith 1994). This is a central feature of the scientific process.

We also have two reasons for assessing the cause of deviations from predictions. First, a more complete understanding of subjects' deviations can lead to future research that refines the theoretical framework and facilitates investigations of when and why subjects deviate from the predictions of economic theory (Camerer 1997). Second, from a policy perspective, it is important to distinguish faulty anticipations from suboptimal actions, because the policy implications of these two phenomena differ. If auditors suffer from faulty anticipations, this suggests an inadequate understanding of the strategic setting that could perhaps be corrected via training and experience. By contrast, if auditors respond suboptimally to strategic behavior in spite of correctly anticipating that behavior, this suggests more than simple misunderstanding. For example, auditors may avoid taking certain actions that they find unfair, even if such actions would increase their expected wealth. A better understanding of such behavior can help policymakers anticipate the human element associated with different auditor liability regimes.

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[1] David Landsittel, in a presentation at the 2000 Midyear Auditing Meeting, indicated that auditors tend to be able to identify their clients' risk factors. However, once identified, auditors do not generally react to these risk factors in an efficient manner. Bifurcating auditors' decision making in this way is consistent with our two-step analysis of deviations that distinguishes whether auditor-subjects understand the strategic setting by anticipating the actions of investors and whether they choose the optimal response, given their understanding of the setting.

Our analysis of subjects' deviations from predictions also responds to Kachelmeier's (1996a, 1996b) recommendation that experiments should do more than simply verify that subjects prefer more money to less. He argues that it is overly simplistic to question whether human behavior can be predicted more accurately with psychological or economic models. Rather, he argues that behavior is likely case-specific and researchers should recognize that both economic and psychological models could be useful in understanding human behavior. We agree and therefore combine our test of economic predictions with an examination of deviations from these predictions to help calibrate the sensitivity of subjects to various economic assumptions.

The results of our experiment are for the most part consistent with the qualitative predictions of Schwartz's model. For example, we find that the Negligence/OOP, Negligence/IOI, and Strict/IOI regimes generate equal levels of social welfare, as predicted by the model. However, contrary to predictions, these three regimes do not lead to higher welfare than the Strict/OOP regime. There are two reasons Schwartz's model predicts the Strict/OOP regime will produce less welfare. First, this regime induces investors to overinvest relative to the social optimum because investments are risk-free to investors. We find that investors do invest more than in the other three regimes, but not to the extreme predicted by the model. Second, the model predicts auditors will overinvest in audits (which is a cost to society), in order to lower the frequency of having to pay damages. Our experimental results show that subjects playing the role of the auditor (hereafter denoted as "auditor-subjects") do audit more under the Strict/OOP regime than the other three regimes, but again, not to the extreme predicted by the model. Thus, social welfare is higher than predicted in the Strict/OOP regime because overinvesting and overauditing are less extreme than predicted. One implication of these findings is that point predictions from this economic theory are not supported in an environment designed to give the theory the best shot.

Although the four regimes do not differ from an efficiency perspective, they do result in different distributions of wealth. Under the Strict/OOP regime, payoffs to investors are significantly higher and payoffs to auditor-subjects are significantly lower than under the other three regimes. That is, auditor-subjects subsidize investors under this regime. This finding is consistent with the accounting industry's reluctance to adopt strict liability (Cave 1985). It is important to note that audit fees are fixed in our experiment, and thus we do not know whether auditors who set fees in a competitive-bidding process may be able to increase their fees sufficiently to offset the wealth loss in the Strict/OOP regime. We discuss this limitation in more detail later in the paper.

With respect to our analysis of deviations, we find that auditor-subjects behave differently under the four regimes in terms of anticipation errors and departures from best responses. For example, auditor-subjects anticipate investments most accurately under the Strict/OOP regime, but surprisingly, they are least likely to choose the optimal response given their anticipations. That is, auditor-subjects in this regime understand investors' strategies, but do not take the optimal action based on this knowledge.

Our analysis of subjects' deviation from the model's point predictions contributes to the accounting literature because bisecting subjects' decision-making processes into anticipations and responses is fundamental to understanding when the Nash predictions are likely to be empirically valid. Our findings suggest that the predictive power of the Nash equilibrium may be context-specific and apply more closely to some regimes than others. This suggests that researchers should consider the decision context (e.g., perceived fairness of the regimes, the knowledge of others' payoffs, etc.) when formulating economic hypotheses.

The paper proceeds as follows: Section II presents the theoretical framework and the parameters used in the experiment. In Section III we present the optimal strategies, equilibria for the four legal regimes, and a discussion of factors related to subjects' deviations from predictions. Section IV describes the experimental design and methods, Section V presents the results, and Section VI concludes with a summary.

II. THEORETICAL FRAMEWORK AND EXPERIMENTAL PARAMETERS

Setting

An investor makes an investment decision in a risky project, where the returns depend on an unobservable state of nature. We denote the *ex ante* probability of a Good state by λ and the *ex ante* probability of a Bad state by $1 - \lambda$. If the state is Good, an investment of I will yield a return of R(I), where R(I) increases at a decreasing rate. The net return is therefore $R(I) - I$. If the state is Bad, the investment yields a zero return so the net return is $-I$. In the experiment the probability of a Bad state, $1 - \lambda$, is set to 0.65. Since legal regimes only play a role when a Bad state is misreported, we set $1 - \lambda$ sufficiently high to allow frequent occurrences of Bad states. Table 1 summarizes the notation and the parameters used in the experiment.

Although the investor does not know the true state of nature at the time of making the investment decision, the auditor can reduce the *ex ante* uncertainty using an audit technology that is subject to a one-sided error. That is, a Good state is always reported as G,[2] but a Bad state could be erroneously reported as G. Audit quality is defined as the probability

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[2] The assumption that the auditor correctly identifies a good state is consistent with the assumption that the risk of an incorrect rejection is negligible (or zero) as mentioned in SAS No. 39, paragraphs 12 and 13 (AU Sections 350.12 and 350.13).

TABLE 1
Investors' and Auditors' Parameter Values

	Notation and Value(s)			
Related to investors:				
Investment level (I)	I_1	I_2	I_3	I_4
Investment amount	5,000	10,000	15,000	30,000
Return on investment R(I)	25,000	46,000	52,000	70,000
Related to auditor-subjects:				
Audit level (A)	A_1	A_2	A_3	A_4
Audit quality—the probability that the report is B when the state is Bad	51%	65%	80%	90%
Audit cost (C)	50	400	1,000	2,800

that the auditor detects a Bad state and reports B.[3] The cost of the audit is increasing and convex in audit quality. In the experiment, auditor-subjects choose among four levels of audit: A_1, A_2, A_3, and A_4, representing a 51 percent, 65 percent, 80 percent, and 90 percent chance of detecting a Bad state at costs of 50, 400, 1,000, and 2,800, respectively.

The investor makes an investment decision after observing the auditor's report. If the report is B, the investor will invest zero, because a B report always correctly reveals the state of nature as Bad. If the report is G, the investor will select among four levels of investment: I_1, I_2, I_3, and I_4 representing investment amounts of 5,000, 10,000, 15,000, and 30,000, respectively. The returns on the investments when the state is Good are 25,000, 46,000, 52,000, and 70,000 respectively, consistent with the assumption that returns are increasing at a decreasing rate. If the report is G but the state is Bad, the return is zero, and the parties proceed to court.[4] The legal regime determines whether the auditor is liable, and if liable, the amount of damages to be paid.

Legal Regimes

A legal regime is a combination of a liability rule and a damage measure. We consider two liability rules—the strict liability rule and the negligence rule—and two measures of damages—out-of-pocket damages and independent-of-investment damages.

The strict liability rule holds the auditor liable for damages at all levels of audit. That is, auditors choosing audit levels of A_1, A_2, A_3, or A_4 are culpable for damages resulting from investors' reliance on misleading reports. Although the auditor is never immune from culpability when misreporting under the strict regimes, higher audit quality reduces the probability of damages. We examine the strict liability rule because it is implemented in product liability cases, and has been proposed as an alternative to the auditors' current negligence rule (see Dopuch and King 1992; Shavell 1980).

The negligence rule holds the auditor liable for damages resulting from a misleading report only if the audit quality is less than due care. Schwartz (1997) predicts that a clear specification of due care can lead to socially optimal levels of audit and investment. We therefore operationalize due care in the experiment as if it were clearly defined by setting it to A_3 (i.e., 80 percent probability of detecting a "Bad" state). Auditors under the negligence regimes who choose audit levels A_3 or A_4 do not have to make liability payments to investors even if they issue the report G in a Bad state. However, auditors who choose audit levels A_1 or A_2 are liable for payments according to the damage measure in place if a Bad state is reported as G. The due care standard, A_3, is common knowledge.

The OOP damage measure is the measure most commonly used to assign damages under Section 11 of the 1933 Securities Act and Rule 10b-5 of the 1934 Securities Exchange Act.[5] Under this measure, damages are the difference between the amount paid for a security and the price at which the security would have been traded had there not been a misrepresentation. In our setting, the OOP loss is equal to the initial investment amount because the return to the investor is zero when the state is Bad.

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[3] In practice, auditors do not issue G and B reports, but rather express their opinion on the financial statements. However, our G report can be viewed as corresponding to a favorable ("clean") audit opinion, while a B report corresponds to a qualified opinion.

[4] Costless litigation simplifies the analysis but does not alter the qualitative results.

[5] See the federal statutes for discussion of damages under §11(e) of the 1933 Securities Act (15 U.S.C. SS 77k(e)) and Rule 10b-5 of the 1934 Securities Exchange Act (15 U.S.C. §78j(b)).

The IOI damage measure is not currently employed in securities laws. However, Schwartz (1997) demonstrates that this measure can dominate the OOP measure because it removes the investors' incentive to overinvest. In the experiment, the IOI measure of damages is set at the I_2 investment level, which is 10,000. This value induces the socially optimal level of investment.[6]

Combining the two liability rules with the two damage measures yields four legal regimes: Strict/OOP, Negligence/OOP, Strict/IOI, and Negligence/IOI. The following summary presents the damage payments that the auditor transfers to the investor when a Bad state is misreported as G under the four legal regimes:

Legal Regime	*When is the Auditor Liable?*	*Damages Paid*
Strict/OOP	At all audit levels: A_1, A_2, A_3, A_4	Actual investment amount
Negligence/OOP	Only if the auditor chooses A_1 or A_2	Actual investment amount
Strict/IOI	At all audit levels: A_1, A_2, A_3, A_4	10,000
Negligence/IOI	Only if the auditor chooses A_1 or A_2	10,000

King and Schwartz (1999) report research related to this study by investigating two questions: (1) do different legal regimes induce different convergence (or learning) patterns, and (2) how do auditor-subjects react to the actual imposition of financial penalties under the various regimes? In that study, auditor-subjects have no uncertainty about investors' strategies, but the legal regimes vary in terms of complexity. In some, the auditor faces only a state uncertainty, (whether the state is Good or Bad), while in others the auditor faces an additional level of uncertainty due to a vague definition of due care. With regard to the first question, the authors find that the convergence of audit quality choices does not differ significantly across the legal regimes, even though the regimes differ in terms of complexity. The second question arises because economic theory suggests subjects choose actions based on the *expectation* that penalties will be incurred, and the *actual occurrence* of a penalty should not change behavior unless it is inconsistent with the subject's expectation. In contrast, psychology theory suggests that the occurrence of a penalty will change behavior because subjects want to avoid actions that lead to unfavorable outcomes. King and Schwartz (1999) find that the actual imposition of penalties significantly affects subjects' choices of audit quality in the short run. In particular, the variability of audit quality increases after a penalty is imposed, because some auditor-subjects choose to decrease audit quality whereas others choose to increase audit quality. This effect decays within several rounds.

III. STRATEGIES AND PREDICTIONS

In this section we first outline the game theoretic strategies of the players and then present the Nash equilibrium for each of the four legal regimes. Finally, we present hypotheses addressing two possible causes for subjects deviating from the theoretical predictions.

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[6] Schwartz (1997) shows that the IOI damage measure can remove the investor's incentive to overinvest if damages are set at any level that is not a function of the actual investment. However, in order to induce the socially optimal audit quality, damages need to be set at the socially optimal level of investment.

Game Theoretic Predictions

Auditors

Payoffs for the auditor in this model consist of a flat fee (an endowment of 12,000 units of experimental currency per period), less the cost of audit (increasing and convex with respect to the audit level), less liability transfers to investors. Since audit fees are flat, auditors maximize net payoffs by minimizing the sum of audit costs and expected liability. If damages are determined based on the OOP measure of damages, the expected liability is a function of the actual investment level. Consequently, the auditor's optimal level of audit may increase with the investment level. When damages are based on the IOI measure, the auditor's expected liability does not vary with the investment level and the auditor's optimal level of audit is constant across all investment levels. Specifically, the auditor's optimal strategy is to select A_3 for all anticipated investment levels under the IOI regimes.

In the Strict/OOP regime, the auditor's optimal strategy is to audit at the A_2 level when anticipating the investor to invest at the I_1 level, to audit at the A_3 level when anticipating the investor to invest at the I_2 or I_3 levels, and to audit at the A_4 level when anticipating the investor to invest at the I_4 level. For an auditor operating under a negligence liability rule with clear due care, the optimal strategy is to exercise due care. An exception to this rule is when the cost of due care is "excessive," in which case the auditor reverts to an audit level that would have been chosen under a strict liability rule. The cost of due care in our experiment is not excessive, so the optimal strategy for the auditor under the negligence liability rule with clear due care is A_3.

Investors

The investor's payoffs in this model consist of a return on investment when the state is Good, plus liability transfers from the auditor when the state is Bad, net of the initial investment in the project. The investor's optimal strategy is to choose an investment level that maximizes net expected payoffs. An investor who suffers damages under the Strict/OOP regime is always made whole by the auditor, (i.e., the investor receives I from the auditor), and therefore the investment is risk-free. In our setting, the investment that maximizes the expected net payoffs under the Strict/OOP regime is I_4. Under the Negligence/OOP regime the investor is made whole if the auditor exerts less than due care, and receives no damages if the auditor meets or exceeds due care. Under this regime an investor who expects the auditor to choose A_1 or A_2 should exercise the same strategy that applies to the Strict/OOP regime, and choose I_4. An investor who expects the auditor to choose A_3 or A_4 should choose I_2 or I_4 respectively.

The IOI regimes set damages at a constant level, independent of the actual investment amounts. Consequently the investor's optimal strategy is to invest at the socially optimal level (I_2) unless the audit quality is A_4, in which case the investor should invest at I_4 (because with A_4 there is a higher probability that the state is Good).

Equilibria and Hypotheses

The game theoretic solution of this model indicates that social welfare, which is defined as the sum of the net payoffs for the auditor and the investor, is maximized under three legal regimes: Negligence/OOP, Strict/IOI, and Negligence/IOI. It further predicts that the Strict/OOP regime induces excessive levels of investment and audit, and consequently generates a lower social welfare relative to the other regimes. Given our experimental values that were chosen to be consistent with the game theoretic assumptions, the predicted equilibria for the four legal regimes are:

Legal Regime	*Audit Level (Cost)*	*Investment Level (Amount)*	*Social Welfare*
Strict/OOP	A_4 (2,800)	I_4 (30,000)	7,100
Negligence/OOP	A_3 (1,000)	I_2 (10,000)	8,100
Strict/IOI	A_3 (1,000)	I_2 (10,000)	8,100
Negligence/IOI	A_3 (1,000)	I_2 (10,000)	8,100

The first set of hypotheses tests these theoretical predictions. Specifically, we hypothesize that auditors (investors) choose the same level of audit (investment) when operating under the Negligence/OOP, Strict/IOI, and Negligence/IOI regimes. We further hypothesize that auditors (investors) who operate under the Strict/OOP regime choose a higher level of audit (investment) than that chosen under any of the other three regimes. Formally:

$$\mathbf{H1}_{\mathbf{alt}}\mathbf{:}\ A^{\text{Negligence/OOP}} = A^{\text{Strict/IOI}} = A^{\text{Negligence/IOI}} < A^{\text{Strict/OOP}}.$$

$$\mathbf{H2}_{\mathbf{alt}}\mathbf{:}\ I^{\text{Negligence/OOP}} = I^{\text{Strict/IOI}} = I^{\text{Negligence/IOI}} < I^{\text{Strict/OOP}}.$$

We also hypothesize that the social welfare (SW) generated under the Negligence/OOP, Strict/IOI, and Negligence/IOI regimes will be the same, and these three regimes will generate higher social welfare than the Strict/OOP regime. Formally:

$$\mathbf{H3}_{\mathbf{alt}}\mathbf{:}\ SW^{\text{Negligence/OOP}} = SW^{\text{Strict/IOI}} = SW^{\text{Negligence/IOI}} > SW^{\text{Strict/OOP}}.$$

Deviations from Theoretical Predictions

The game theoretic model assumes that each player anticipates the action of his/her counterpart and then best responds (i.e., selects an action that maximizes wealth, given the anticipated action). The optimal strategies and the equilibria derived in Schwartz's model are based on these assumptions. However, subjects may deviate from these strategies. We investigate two possible reasons for deviations: (1) difficulty in anticipating the counterparts' actions and (2) choosing responses that do not maximize expected payoffs, given the expectations of the counterparts' actions. To distinguish between these factors, we ask subjects to privately report their anticipation of the counterparts' actions. This provides a measure of each subject's anticipation of his/her counterpart's actions as well as a way to investigate the extent to which subjects best respond to anticipated actions.

Anticipation

The model requires that auditors and investors know how actions map into payoffs for both players. In the experiment, each subject knows his/her own expected payoffs and those of his/her counterpart for each strategy combination. This information is sufficient to allow subjects to anticipate the action of their counterpart and to optimally respond. However, previous research suggests that subjects often deviate from theoretical predictions (e.g., Bloomfield 1997; Dopuch et al. 1997; Kachelmeier 1991; King and Schwartz 1999). Since we have no theoretical basis on which to predict the frequencies of such deviations across the four regimes, our approach will be exploratory:

$H4_{alt}$: Auditors' ability to anticipate investment amounts is not the same across regimes.

$H5_{alt}$: Investors' ability to anticipate audit costs is not the same across regimes.

Best Response

Economic theory assumes that people choose actions that maximize their expected utility. Our model assumes that players are risk-neutral, so a best response is an action that maximizes expected payoffs. A deviation from the best response indicates that the subject selects a choice that does not maximize his/her expected monetary payoffs. Such a deviation could be because the subject inadvertently made an error, or because of concerns with other factors, such as fairness, reciprocity, revenge, etc.

Under some regimes, payoffs are affected by the counterparts' choices and in others they are not. For example, under the two IOI regimes, damages are set independent of the actual investment, and the auditor's best response therefore is constant for all investment levels. Under these two regimes the best response may be easier to derive because it is independent of the counterparts' actions. Thus, under regimes where the best response is not sensitive to the counterparts' choices we may expect to see it chosen more frequently. However, we do not have a model to guide our predictions regarding frequencies of best responses (in the game theoretic model, the frequency is assumed to be 100 percent across all regimes), so, again, our hypotheses are exploratory:

$H6_{alt}$: Auditors do not choose the best response equally across the four legal regimes.

$H7_{alt}$: Investors do not choose the best response equally across the four legal regimes.

IV. EXPERIMENTAL DESIGN AND METHODS

In this section we present the experimental design and describe the methods and procedures. The experiment employed the following 2 × 2 between-subjects design.

	Out-of-Pocket Damages (OOP)	**Independent-of-Investment Damages (IOI)**
Strict Liability	Strict/OOP	Strict/IOI
Negligence Liability	Negligence/OOP	Negligence/IOI

The subject pool consisted of 80 undergraduate business school students. Eight sessions (two sessions for each cell) were conducted, each lasting about two hours. Ten subjects participated in each session, five playing the role of an auditor (called "reporter" in the experiment), and five playing the role of an investor. Roles were assigned randomly, and subjects remained paired with the same counterpart throughout each session. Upon arrival at the experimental laboratory, subjects were given written instructions that were projected on a screen and read aloud by the administrator. Upon completion of the instructions, the experimenter answered clarifying questions, and then demonstrated the software.[7] Finally, a quiz was administered to assess subjects' understanding of the experiment.[8]

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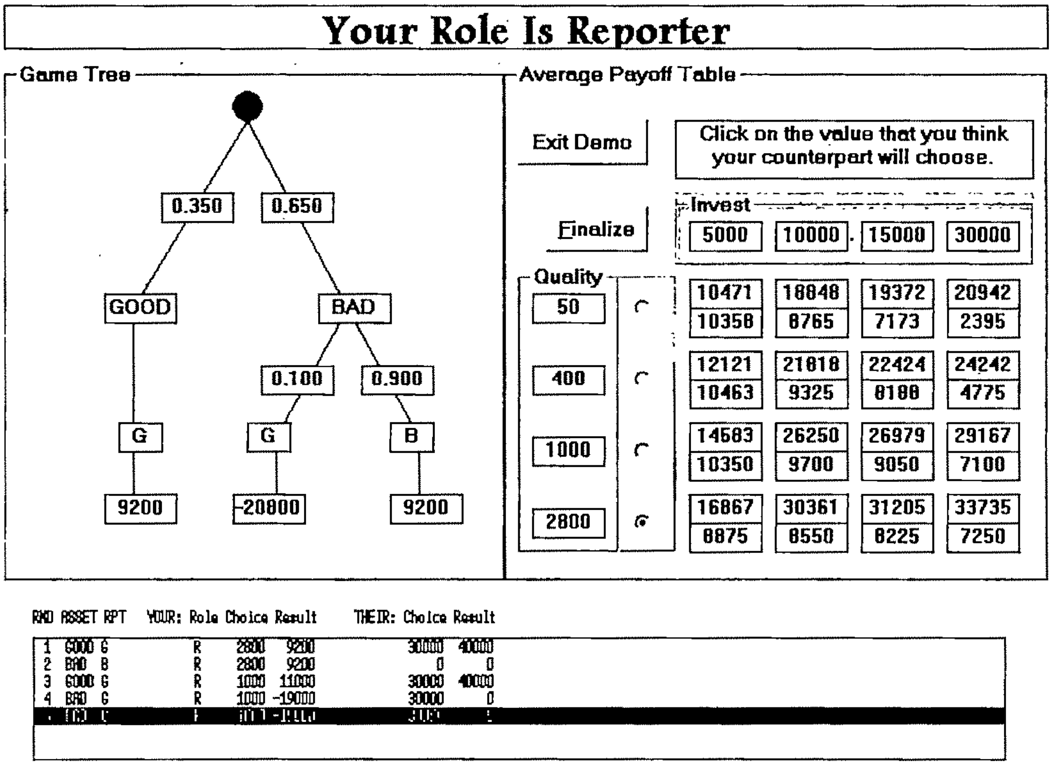
[7] All interactions between subjects occurred on networked PCs. Throughout the instructions, training periods, and actual experiment, participants were prevented from communicating with each other. Instructions are available upon request.

[8] The quiz had six questions and subjects earned $0.40 for each correct answer. The average score on the quiz was over 90 percent.

Figure 1 shows the computer screen used by the auditor-subjects under the Strict/OOP regime. The screen has three basic parts: the game tree shown on the upper left-hand side, the average payoff table shown on the upper right-hand side, and the history screen shown on the bottom. The game tree depicts the *ex ante* probabilities of a Good and a Bad state as 0.35 and 0.65, respectively, as well as the conditional probabilities for a G and a B report when the state is Bad. The conditional probabilities (shown as 0.10 and 0.90) depend on the auditor's choice of audit quality. In this case, the auditor-subject selects 2,800 as the audit quality, shown by the marker (and highlights) in the fourth row of the average payoff table. The game tree also shows the payoffs for each branch of the game tree. In this case the payoffs are either 9,200 or −20,800, which are determined in part by the auditor-subject's anticipation that the investor will invest 30,000, as shown by the marker in the fourth column of the average payoff table.

The average payoff table shows the expected payoffs for each combination of audit cost and investment amount. Subjects could highlight different combinations on the expected-payoffs table and appraise the impact these combinations have for both players. The top number in each cell of the table represents the expected payoff for the counterpart, and the bottom number in each cell represents the expected payoff for the subject. The history window shows a summary of the choices of both players and their payoffs for each round.

FIGURE 1
Computer Screen for Auditor-Subjects under the Strict/OOP Regime



Click on the value that you think your counterpart will choose.

Quality		Invest 5000	10000	15000	30000
50	○	10471 10358	18848 8765	19372 7173	20942 2395
400	○	12121 10463	21818 9325	22424 8188	24242 4775
1000	○	14583 10350	26250 9700	26979 9050	29167 7100
2800	●	16867 8875	30361 8550	31205 8225	33735 7250

```
RND ASSET RPT   YOUR: Role Choice Result     THEIR: Choice Result
 1  GOOD  G              R    2800   9200            30000  40000
 2  BAD   B              R    2800   9200                0      0
 3  GOOD  G              R    1000  11000            30000  40000
 4  BAD   G              R    1000 -19000            30000      0
[illegible]
```

Figure 2 shows the investor's screen, which also has a game tree, an average payoff table, and a history window. The game tree provides the posterior probabilities of Good and Bad states conditional on a G report, based on the investor's estimate of audit cost. In this case, the investor expects audit cost to be 2,800 (shown as the marker in the fourth column of the payoff table) which leads to a posterior probability of 0.843 and 0.157 for the Good and Bad state, respectively, given a G report is issued.

The game was played simultaneously. First each player was asked to enter into the computer the action he/she anticipated of his/her counterpart.[9] This information was not made public and subjects never observed their counterparts' anticipation. Then players made their choices, the computer randomly chose a state of nature based on a 0.35 probability for a Good state, and the computer generated a G or a B report based on the quality of audit chosen by the auditor. The report was transmitted to both players and the investment

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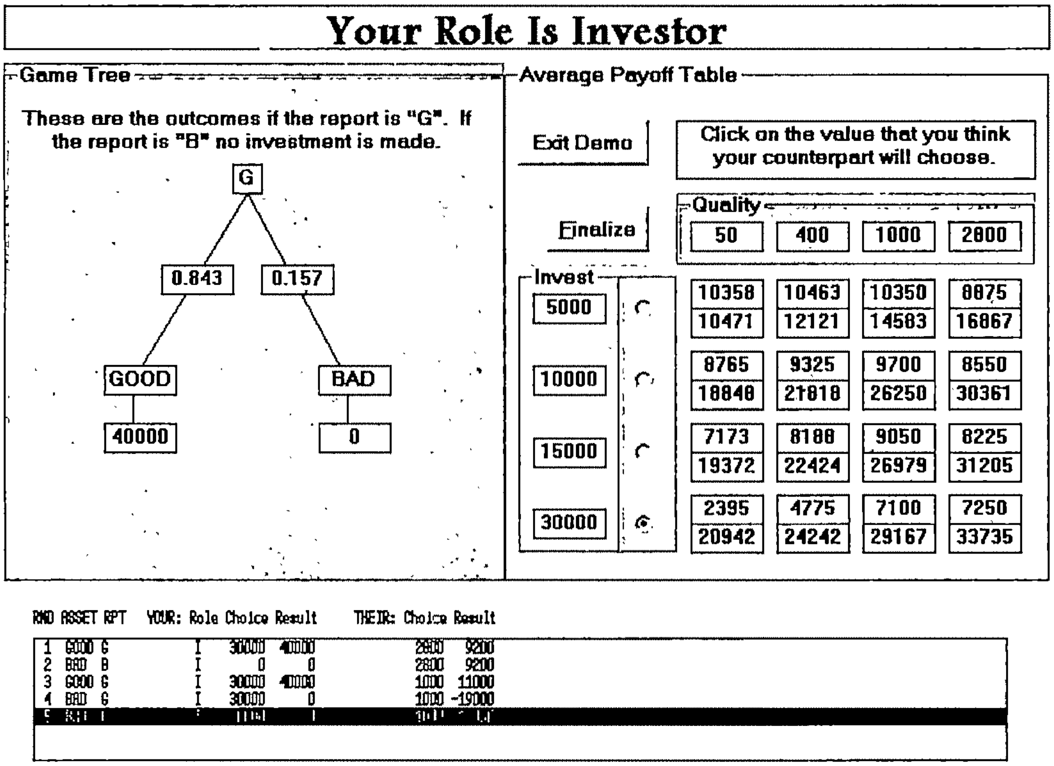
[9] Although investments do not affect auditors' liability in the IOI regimes, we record auditors' anticipations because they may be relevant for auditors who are concerned with fairness or display altruism (e.g., Kachelmeier et al. 1991; Kahneman et al. 1986). Subjects did not receive monetary compensation for an accurate anticipation because this could have affected their incentives in their roles as auditors or investors. Thus, the anticipation data might not fully reflect subjects' true anticipation, as they had no monetary incentive to report it truthfully. However, we have no reason to believe that subjects did not take this task seriously.

FIGURE 2
Computer Screen for Investors under the Strict/OOP Regime



These are the outcomes if the report is "G". If the report is "B" no investment is made.

Click on the value that you think your counterpart will choose.

Invest		Quality 50	400	1000	2800
5000	○	10358 10471	10463 12121	10350 14583	8875 16867
10000	○	8765 18848	9325 21818	9700 26250	8550 30361
15000	○	7173 19372	8188 22424	9050 26979	8225 31205
30000	●	2395 20942	4775 24242	7100 29167	7250 33735

```
RND ASSET RPT   YOUR: Role Choice Result     THEIR: Choice Result
1  GOOD  G            I   30000  40000              2800    9200
2  BAD   B            I       0      0              2800    9200
3  GOOD  G            I   30000  40000              1000   11000
4  BAD   G            I   30000      0              1000  -19000
5  [illegible]
```

level chosen by the investor was carried out if and only if the report was G. Next the return on investment was realized and liability payments were transferred from the auditor to the investor, according to the rules of the legal regime in place.

V. RESULTS

Comparing Audit Levels across Legal Regimes

The model predicts that auditor-subjects will choose the socially optimal level of audit (A_3) under the Negligence/OOP, Strict/IOI, and Negligence/IOI regimes, and (A_4) under the Strict/OOP regime. Table 2 summarizes auditor-subjects' choices for each of the four regimes by showing the frequency of each audit level chosen (the theoretically predicted levels appear in bold), mean audit cost, mean deviation between actual and predicted audit cost, and standard error for mean audit cost.[10] For example, under the Strict/OOP regime, auditor-subjects select audit level A_1 13 times, which represents 4.4 percent of the total audit choices for this regime. Note the predicted audit level (A_4) is selected 118 times (39.3 percent of total) in this regime. The mean audit cost for this regime is 1,631, the mean deviation between actual and predicted audit cost is –1,169, and the standard error is 223.

We first use an ANOVA to test the null hypothesis that all four regimes induce equal audit costs. This test rejects $H1_{null}$ at the 0.01 level. We then perform a Tukey multiple comparison test and find that the mean audit cost under the Strict/OOP regime is significantly higher than the mean audit costs under the three other regimes ($p < 0.01$). The mean audit costs under the three other regimes are not significantly different from each other.

We repeat the test of $H1_{alt}$ using the frequency of audit levels rather than the mean cost of audit. We first test whether the frequency of each audit level chosen varies across regimes using a Chi-square test, and reject $H1_{null}$ at $p < 0.01$. Since the model predicts audit levels across the Negligence/OOP, Negligence/IOI, and Strict/IOI regimes are equal to A_3, we investigate the proportion of audit choices using a multiple test of proportions. We find no significant difference between the Strict/IOI and the Negligence/OOP regimes, consistent with our finding using the test of means. However, we find that auditor-subjects choose the predicted audit level more often under the Negligence/IOI regime than under both the Negligence/OOP and Strict/IOI regimes ($p < 0.01$). We also find that auditor-subjects choose the predicted audit level less frequently under the Strict/OOP regime than the other three regimes ($p < 0.01$).

In summary, both tests (means and proportions) lead us to reject the hypothesis that audit costs are equal across all four regimes. We conclude that the Strict/OOP regime induces a higher audit cost relative to the other three regimes. Although the Negligence/IOI regime induces a higher proportion of the predicted audit than the Strict/IOI or the Negligence/OOP, the test of means does not reveal any significant differences among these regimes.

The mean deviation between actual audit cost and the cost predicted by the theoretical model is negative and significant under the Strict/OOP regime ($p < 0.01$), and under the Strict/IOI and Negligence/IOI regimes ($p < 0.05$). Auditor-subjects may apply lower-than-predicted audit levels because they underestimate investment amounts, or they may choose sub-optimal audit levels despite an accurate anticipation of investment amounts. In the next section we explore these possibilities.

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[10] We average all 30 observations for each subject, treat that average as a single data point, and calculate the standard error of the ten resulting averages.

TABLE 2
Audit Costs Chosen by Auditor-Subjects under the Four Legal Regimes

	Strict[a] Out-of-Pocket[c]	*Negligence[b] Out-of-Pocket*	*Strict Independent-of-Investment[d]*	*Negligence Independent-of-Investment*
Audit level (cost)	*Frequency (percentage)*	*Frequency (percentage)*	*Frequency (percentage)*	*Frequency (percentage)*
A_1 (50)	13 (4.4)	34 (11.3)	55 (18.3)	51 (17.0)
A_2 (400)	18 (6.0)	43 (14.3)	48 (16.0)	6 (2.0)
A_3 (1,000)	151 (50.3)	**197 (65.7)**	**184 (61.3)**	**242 (80.7)****
A_4 (2,800)	**118 (39.3)[e]****	26 (8.7)	13 (4.3)	1 (0.3)
Mean audit cost	1,631**	962	808	833
Mean deviation between actual and predicted audit costs	$-1{,}169^{++}$	−38	-192^{+}	-167^{+}
Standard error of mean audit cost, n = 10	223	93	84	74

**Significantly different from the other three regimes at $p < 0.01$.

$^{+,\,++}$Significantly different from zero at $p < 0.05$, $p < 0.01$, respectively.

[a] Strict liability rule: A liability rule that penalizes auditors when assets are reported as G (Good), but have zero payoff.

[b] Negligence liability rule: A liability rule that penalizes auditors when audit quality is below due care and the asset has a zero payoff. The due-care level is A_3 at a cost of 1,000.

[c] Out-of-pocket damages: A damage measure that requires liable auditors to pay damages equal to the amount of the investment amount.

[d] Independent-of-investment: A damage measure that requires liable auditors to pay damages of 10,000, independent of the investment amount.

[e] Choices that match the theoretical prediction appear in **bold**.

Comparing Deviations of Audits from Predicted Levels across Legal Regimes

Auditor-Subjects' Anticipation of Investors' Level of Investment

Hypothesis 4_{alt} predicts that auditors' ability to anticipate investments is not the same under all four legal regimes. Panel A of Table 3 presents the percentage of matches between anticipated investment amounts and actual investment amounts, mean deviation of anticipated investment amounts from actual investment amounts, and mean absolute deviation of anticipated investment amounts from actual investment amounts.[11]

We first test $H4_{alt}$ by applying the test of proportions to the frequency of matches between the anticipated investment and the actual investment. The percentage of matches

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[11] The mean deviation reveals whether auditors underestimated or overestimated the investors' investment levels. However, positive and negative deviations cancel out in mean deviations, so we also report the average absolute deviation.

TABLE 3
Auditors' Anticipation of Investment Amounts and Auditors' Choices of Audit Cost Given this Anticipation

	Strict Out-of-Pocket[a]	*Negligence Out-of-Pocket*	*Strict Independent-of-Investment*	*Negligence Independent-of-Investment*
Panel A: Auditors' Anticipations of Investment Amounts and Deviations from Actual Investment Amounts				
Percentage of matches between anticipated investment amounts and actual investment amounts	67.0%**	33.7%*	43.0%	46.7%
Mean deviation of anticipated investment amounts from actual investment amounts	−3,183	−1,266	−233	1,817
Mean absolute deviation of anticipated investment amounts from actual investment amounts	5,050	8,133	5,167	6,217
Panel B: Auditors' Response to the Anticipated Investment Amount				
Percentage of auditor-subjects choosing the best response to anticipated investment amounts	51.3%*	65.7%	61.3%	80.7%**
Mean deviation of the actual audit cost from the best response to anticipation	−619	−38	−192^{+}	−168^{+}
Mean absolute deviation of the actual audit cost from the best response	883**	350	348	180

*, ** Significantly different from the other regimes at $p < 0.05$, $p < 0.01$, respectively.

$^{+}$ Significantly different from zero at $p < 0.05$.

[a] Table 2 defines the regimes.

are 67.0 percent, 33.7 percent, 43.0 percent and 46.7 percent for Strict/OOP, Negligence/OOP, Strict/IOI, and Negligence/IOI regimes, respectively. Our statistical tests shows auditor-subjects are significantly more likely to anticipate investments correctly under the Strict/OOP regime (67 percent, $p < 0.01$), and significantly less likely to anticipate investments correctly under the Negligence/OOP regime (33.7 percent, $p < 0.05$). The tests show no difference between the Strict/IOI regime (43 percent) and the Negligence/IOI regime (46.7 percent). To assess the direction of the deviations when investments were not anticipated correctly, we investigate the mean deviations of the anticipated investment from actual investment and find no significant difference under the four regimes.

To learn more about the magnitude of the deviations between the actual investments and the level anticipated by auditor-subjects, we compare the mean absolute deviations across the four regimes and find no significant difference among the four regimes. This result may appear inconsistent with the test of proportion, which finds a significantly higher match under the Strict/OOP regime. However the difference is largely due to the discreteness of investment choices. For example, actual investments in the Strict/OOP regime are mostly at the 30,000 amount, and the smallest absolute deviation from that level is 15,000.

Overall, we reject the null hypothesis that auditor-subjects anticipate investment levels with equal accuracy across all four legal regimes. We conclude that auditor-subjects' ability to predict investment is highest under the Strict/OOP regime, followed by the Strict/IOI and the Negligence/IOI regimes, and lowest under the Negligence/OOP regime. As discussed below, the increased accuracy of the auditor-subjects' anticipation under the Strict/OOP regime may be due to a lower variability in investors' investment choices. The next section explores the possibility that auditor-subjects do not adopt strategies that maximize expected payoffs.

Auditor-Subjects' Responses to their Anticipation of Investors' Level of Investment

In this section we explore whether auditor-subjects employ expected-payoff-maximizing strategies and whether they do so differently across the four legal regimes. We address this question by comparing chosen audit levels to the theoretical best response, given anticipations. Panel B of Table 3 presents the percentage of auditor-subjects best responding to their anticipations of investment levels, the mean deviation of the actual audit from the best response to anticipation, and the mean absolute deviation of the actual audit from the best response.

Hypothesis 6_{alt} predicts that, across the four legal regimes, auditor-subjects will have different responses, given their anticipation of investors' level of investment. The percentages of auditor-subjects choosing the best response to anticipated investment are 51.3 percent, 65.7 percent, 61.3 percent, and 80.7 percent for Strict/OOP, Negligence/OOP, Strict/IOI, and Negligence/IOI, respectively. Using a test of proportions, we find auditor-subjects choose the best response least often under the Strict/OOP regime (51.3 percent, $p < 0.05$ vs. all other regimes), most often under the Negligence/IOI regime (80.7 percent, $p < 0.01$ vs. all other regimes), and there is no significant difference between the frequencies of best responses under the Negligence/OOP and the Strict/IOI regimes (65.7 percent and 61.3 percent, respectively). In all four regimes, auditor-subjects who do not choose the best response select a lower average level of audit, giving rise to a negative mean deviation from the best response. Mean deviations of actual audit cost from the best response to the anticipated investment level are significantly different from zero under the Strict/IOI regime ($p < 0.05$) and the Negligence/IOI regime ($p < 0.05$). The mean absolute deviation under the Strict/OOP regime is significantly higher than the other three regimes ($p < 0.01$). Overall, we reject $H6_{null}$ and conclude that auditor-subjects choose actions consistent with expected payoff maximization most often under the Negligence/IOI regime and least often under the Strict/OOP regime.

The analysis of auditor-subjects' anticipations and responses suggests that although they correctly anticipate damages most often under the Strict/OOP regime, they are least likely to choose the best response under this regime. Thus, the low frequency of matches between auditor-subjects' choices under the Strict/OOP regime and the predicted audit is not primarily due to incorrect anticipation of the level of investors' investments. It is not clear why auditor-subjects do not best respond, but one possible reason is that auditor-subjects perceive an inequity relative to investors, and thus are less willing to incur high audit cost, and instead bear higher liability.

Auditor-subjects under the IOI regimes demonstrate equal ability to anticipate investments, but are more likely to best respond under the Negligence/IOI regime than under the Strict/IOI regime. We speculate that the negligence regime's clear definition of due care may serve as a focal point, consistent with Schelling's (1960) concept of a common reference point. Auditor-subjects' anticipation under the Negligence/OOP is significantly worse than all other regimes ($p < 0.05$). However, the frequency of best responses under Negligence/OOP is significantly higher than under the Strict/OOP regime ($p < 0.05$); is not different from the Strict/IOI regime, and is significantly lower than the Negligence/IOI regime ($p < 0.01$). We posit that uncertainty associated with OOP damages could reduce the attraction of the due care level as a focal point relative to that under the Negligence/IOI regime.

Although this experiment finds that auditors indeed provide lower than predicted audit levels, and consequently bear a significantly higher than predicted liability, the essence of the problem is not that auditors are unable to predict damages. Recall that auditor-subjects most accurately anticipate investment levels (damages) under the Strict/OOP regime, with the highest frequency of a match between anticipated investment and actual investment. Although auditor-subjects seem to accurately anticipate damages under this regime, they apply the best response least often. This may occur because the best response under this regime (audit at the A_4 level at a cost of 2,800) requires a higher level of audit than the other three regimes (audit at the A_3 level at a cost of 1,000). We derive two conclusions from this discussion. First, in our experiment the lower welfare experienced by auditor-subjects who operate under the Strict/OOP regime (discussed below) is not due to uncertainty over the OOP damages. Second, auditor-subjects under the Strict/OOP select lower levels of audit than prescribed by the best response to their own anticipation, although they do, on average, choose higher audit quality than under any other regime. Investigating psychological factors for this behavior may prove a fruitful avenue for future research.

Comparing Investment Levels across Legal Regimes

Hypothesis 2_{alt} predicts that investors choose the same level of investment under the Negligence/OOP, Negligence/IOI, and Strict/IOI regimes, but a higher level of investment under the Strict/OOP regime. Table 4 presents investors' choices under each of the four legal regimes, including the frequency of each investment level, (the predicted choices appear in bold), mean investment amount, mean deviation between actual and predicted investment amount, and standard errors of mean investment.

The null hypothesis that all four regimes induce the same investment amount is rejected based on an ANOVA ($p < 0.01$). A Tukey multiple pairwise-comparisons test reveals that the investment level is significantly higher under the Strict/OOP regime than under the other three regimes ($p < 0.01$). A test of proportions shows that the Strict/OOP regime induces the predicted investment level significantly more often than the other regimes. Additionally, the IOI regimes induce the predicted investment level significantly more often than the Negligence/OOP regime, while the mean investment under Negligence/OOP is significantly higher than the mean investment under the IOI regimes ($p < 0.01$). There is no significant difference between the investments under the Strict/IOI and Negligence/IOI regimes.

In summary, the means tests indicate that the Strict/OOP regime induces higher investment amounts relative to any other regime, while the Strict/IOI and the Negligence/IOI regimes induce the same investment amounts. The Negligence/OOP regime induces a

TABLE 4
Investment Amounts Chosen by Investors under the Four Legal Regimes

	Strict Out-of-Pocket[a]	*Negligence Out-of-Pocket*	*Strict Independent-of-Investment*	*Negligence Independent-of-Investment*
Investment level (amount)	*Frequency (percentage)*	*Frequency (percentage)*	*Frequency (percentage)*	*Frequency (percentage)*
I_1 (5,000)	1 (0.3)	37 (12.3)	62 (20.7)	66 (22.0)
I_2 (10,000)	7 (2.3)	**77 (25.7)****	**159 (53.0)**	**172 (57.3)**
I_3 (15,000)	26 (8.7)	69 (23.0)	54 (18.0)	32 (10.7)
I_4 (30,000)	**266 (88.7)**^{b**}	117 (39.0)	25 (8.3)	30 (10.0)
Mean investment amount	28,150**	18,333**	11,533	11,433
Mean deviation between actual and predicted investment amount	−1,850^{+}	8,333^{++}	1,533	1,433
Standard error of mean investment, n = 10	742	1,715	1,108	1,362

**Significantly different from the other regimes at $p < 0.01$.
$^{+,++}$Significantly different from zero at $p < 0.05$, $p < 0.01$, respectively.
[a] Table 2 defines the regimes and variables.
[b] The predictions appear in **bold**.

lower percentage of matches with the predicted investment and a higher mean investment than the Strict/IOI or Negligence/IOI regimes.

These results are qualitatively consistent with the model's predictions, but there are deviations from point predictions, as found in the audit level results. These deviations may result from incorrectly anticipating the audit level or from adopting a strategy that does not maximize expected payoffs given the anticipated audit level. The next section explores these possibilities.

Comparing Deviations of Investors' Investments from Predicted Levels across Legal Regimes

Investors' Anticipation of Audits

Hypothesis 5_{alt} predicts that investors' ability to anticipate audit levels is not the same across the four legal regimes. Panel A of Table 5 presents the percentage of matches between the anticipated audit level and the actual audit level, the mean deviation of the anticipated audit cost from the actual cost, and the mean absolute deviation of the anticipated audit cost from the actual audit cost.

We test $H5_{alt}$ by applying the test of proportions to the percentage of matches between anticipated audit levels and actual audit levels. Investors are equally likely to anticipate audit levels correctly across the Strict/OOP regime (61.7 percent), the Negligence/OOP regime (55.7 percent), and the Strict/IOI regime (57.0 percent). However, investors under the Negligence/IOI regime are significantly more accurate in anticipating the audit level (73.0 percent, $p < 0.01$) than the other three regimes. None of the mean deviations between the actual and anticipated audit costs is statistically significant.

TABLE 5
Investor's Anticipation of Audit Cost and Investors' Choices of Investment Given this Anticipation

	Strict Out-of-Pocket[a]	*Negligence Out-of-Pocket*	*Strict Independent-of-Investment*	*Negligence Independent-of-Investment*
Panel A: Investors' Anticipants of Audit Cost and Auditors' Actual Audit Cost				
Percentage of matches between anticipated audit cost and actual audit cost	61.7%	55.7%	57.0%	73.0%**
Mean deviation of anticipated audit cost from actual audit cost	64	56	141	75
Mean absolute deviation of anticipated audit cost from actual audit cost	606	521	430	292
Panel B: Investors' Response to the Anticipated Audit Cost				
Percentage of investors choosing best response to the anticipated audit cost	88.7%**	36.3%**	52.0%	59.3%
Mean deviation of the actual investment amount from the best response to anticipation	−1,850+	2,200	333	433
Mean absolute deviation of the actual investment amount from the best response	1,850	9,533**	4,300	3,267

** Significantly different from the other three regimes at $p < 0.01$.
+ Significantly different from zero at $p < 0.05$.
[a] Table 2 defines the regimes and variables.

We also compare the mean absolute deviations to assess whether the magnitude of errors in investors' anticipation of audits varies across legal regimes. We find that investors' anticipation of the audit level does not differ significantly across the four regimes. Thus, there is mixed support for $H5_{alt}$. Based on a test of proportions, we find that investors' ability to anticipate audit level is highest under the Negligence/IOI regime. This is consistent with the clear due-care level (A_3) being a focal point (auditor-subjects selected A_3 80.7

percent of the time under the Negligence/IOI regime—see Table 2). However, our analysis does not show a significant difference among the four regimes in terms of mean deviations and mean absolute deviations.

Investors' Levels of Investment given their Responses to the Anticipated Audit Costs

Next we explore whether investors employ best-response strategies and whether they do so equally across the four regimes. Panel B of Table 5 presents the percentage of investors choosing the best response to the anticipated audit cost, the mean deviation of actual investment from the best response, and the mean absolute deviation of the actual investment from the best response.

Hypothesis 7_{alt} predicts that across the four legal regimes, investors will not best respond equally, given anticipated audits. The Strict/OOP regime has a significantly higher proportion of best responses (88.7 percent) relative to all other regimes ($p < 0.01$) and the Negligence/OOP regime has a significantly lower proportion of best responses (36.3 percent) relative to all other regimes ($p < 0.01$). We find no significant difference between the proportion of best responses under the Strict/IOI regime (52.0 percent) and the Negligence/IOI regime (59.3 percent).[12]

A comparison of mean absolute deviations yields results that are consistent with the test of proportions. The Strict/OOP regime has the lowest numerical mean absolute deviation, although not statistically significant. The Negligence/OOP regime has a significantly larger mean absolute deviation than all other regimes ($p < 0.01$) and the IOI regimes are not significantly different from each other. Consistent with $H7_{alt}$, we conclude that, given the anticipated level of audit, investors are most likely to choose actions that maximize their expected payoffs under the Strict/OOP regime and least likely under the Negligence /OOP regime.

In summary, investors are most likely to correctly anticipate the level of audit under the Negligence/IOI regime, with an equal frequency of correct anticipation of audits across the other three regimes. Investors choose the best response with equal frequency under the IOI regimes, possibly because IOI damages may provide a focal point. Finally, investors choose the best response least often and with the highest mean absolute deviation under the Negligence/OOP regime. It is not clear why this is the case, because the payoff uncertainty for investors under the Negligence/OOP regime is not greater than under the other three regimes.

Comparing Social Welfare across Legal Regimes

The game theoretic model predicts that social optimum can be achieved either by a negligence liability rule with a clear definition of due care, or by a damage measure independent of the actual investment. In this section we compare the social welfare obtained under the four regimes. We also examine the effect a regime has on the payoffs to auditor-subjects and investors.

Table 6 summarizes the payoffs for the four regimes, including the mean social welfare (sum of the payoffs to auditor-subjects and investors), mean total costs to auditor-subjects (the cost of audit plus the liability transfer prior to incorporating the original cash endowment), mean audit cost, mean liability transfer, mean payoffs to investors (return on investment minus investment level plus liability transfer), and mean net return on investment.

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[12] The Strict/OOP regime's negative mean deviation is by construction. That is, the best response under this regime is the highest level of investment, so any deviation from the best response must be negative.

TABLE 6
Summary of Costs, Payoffs, and Social Welfare under the Four Legal Regimes

	Strict Out-of-Pocket[a]	*Negligence Out-of-Pocket*	*Strict Independent-of-Investment*	*Negligence Independent-of-Investment*
Mean social welfare (R(I) − I − C)	6,933	6,734	6,942	7,300
Mean total costs to auditor-subjects (C + L)	4,964**	2,446	3,008	1,599**
Mean cost of audit (C)	1,631**	962	808	833
Mean liability transfer (L)	3,333**	1,483	2,200	767**
Mean payoffs to investors (R(I) − I + L)	11,897**	9,180	9,950	8,900
Mean net return on investment (R(I) − I)	8,564	7,697	7,750	8,133

** Significantly different from the other regimes at $p < 0.01$.
[a] Table 2 defines the regimes and variables.

We begin by comparing the social welfare of the four regimes, measured as the sum of subjects' payoffs. We use approximate randomization[13] and the nonparametric Kruskal-Wallis test to supplement the ANOVA test and find that social welfare does not vary significantly across the four regimes. While these result supports the model's prediction that Negligence/OOP, Negligence/IOI, and Strict/IOI induce comparable levels of social welfare, it does not support the assertion that a strict liability rule combined with an OOP damage measure results in lower social welfare. However, policymakers are also likely to be concerned with equity—how social welfare is divided among individuals. We therefore examine how the various regimes affect the individual welfare of auditor-subjects and investors.

Auditor-Subjects' Welfare

Mean costs incurred by auditor-subjects are shown in Table 6 as 4,964, 2,446, 3,008, and 1,599 for the Strict/OOP, Negligence/OOP, Strict/IOI, and Negligence/IOI regimes, respectively. Auditor-subjects' costs are significantly higher under the Strict/OOP regime and significantly lower under the Negligence/IOI regime ($p < 0.01$). Decomposing auditor-subjects' costs into the cost of audit and the liability transfer reveals that auditor-subjects incur significantly higher costs in both components under the Strict/OOP regime ($p < 0.01$). That is, despite the higher level of audit under the Strict/OOP regime, auditor-subjects also incurred higher liability transfers under this regime, resulting in the lowest welfare for auditor among the four regimes. The mean cost of audit does not vary significantly across the three other regimes, but the mean liability transfer is significantly lower under the Negligence/IOI regime, resulting in the highest auditor welfare under this regime.

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[13] In the approximate randomization approach, a test statistic (e.g., mean) is generated from the actual data; then the data are combined and divided repeatedly and the statistic is computed for each of the random divisions. The p-values represent the percentage of times the statistic from the random divisions is less than the test statistic for the actual data using 40,000 replications. See Edgington (1980) for a discussion of the approximate randomization method.

Investors' Welfare

Mean payoffs to investors are shown in Table 6 as 11,897, 9,180, 9,950, and 8,900 for the Strict/OOP, Negligence/OOP, Strict/IOI, and Negligence/IOI regimes, respectively. We find that mean payoffs to investors are higher under the Strict/OOP regime than under the other three regimes ($p < 0.01$). We decompose investors' payoffs into net return on investment ($R(I) - I$), and liability transfers to examine the source of the higher payoffs. There are no significant differences among the four regimes for net return on investments; however, as we noted before, the liability transfer is significantly higher under the Strict/OOP regime ($p < 0.01$) and significantly lower under the Negligence/IOI. Thus, the higher investors' welfare under the Strict/OOP regime is in part due to the higher liability transfer.

This result implies that the Strict/OOP regime may transfer wealth from auditor-subjects to investors, without significantly changing overall payoffs. Policy implications depend on how policymakers define the objective function. If policymakers are primarily concerned with overall efficiency, then this experiment suggests that all four regimes may be equally appropriate. However, if policymakers are also concerned with equity and wealth distribution, then the Strict/OOP regime may yield significant benefits for investors, and significant costs for auditor-subjects, compared with the other three regimes. The typical solution to such inequities is to transfer wealth back from investors to auditor-subjects. For example, auditors may respond to an increase in their liability exposure by increasing their audit fee, thereby offsetting some or all of the wealth transfers. However, highly competitive audit markets may prevent auditors from raising audit fees sufficiently to eliminate wealth transfers created under the Strict/OOP regime. Previous experimental studies (Dopuch and King 1992) found that auditor-subjects were unable to pass the full cost of the expected liability on to the manager/client under a strict liability setting. Nevertheless, not having endogenous audit fees is a limitation of our study.

VI. SUMMARY

The purpose of this paper is to investigate the effects that legal regimes have on auditors' and investors' decisions. Specifically, we test Schwartz's (1997) predictions that either a negligence liability rule with a clear definition of due care or a damage measure independent of the actual investment maximizes social welfare. We test Schwartz's (1997) model in order to provide evidence on its empirical validity, and thereby contribute to the growing empirical evidence on auditor-investor decision making under different legal regimes.

Our results are consistent with the model in that social welfare levels do not differ significantly across the following three regimes: a negligence liability rule combined with an out-of-pocket damage measure (denoted Negligence/OOP); a negligence liability rule combined with a damage measure that is independent of the actual investment (denoted Negligence/IOI); and a strict liability rule combined with an independent-of-investment damage measure (denoted Strict/IOI). In addition, the audit and investment levels under these regimes are lower than under the regime with a strict liability rule combined with an out-of-pocket damage measure (denoted Strict/OOP). However, in contrast to Schwartz's (1997) predictions, there are no significant differences in the social welfare across the four regimes.

We also find that auditors' welfare is significantly lower and investors' welfare significantly higher under the Strict/OOP regime than under the other three regimes. That is, although the Strict/OOP generated the same size "social welfare pie" as the other regimes, investors received a larger slice, at the expense of auditors. It is possible that this finding is unique to our setting because audit fees are fixed in our experiment. In a competitive market, auditors could negotiate higher fees to offset the wealth loss under the Strict/OOP regime. However, Dopuch and King (1992) find that auditors are unable to pass the full cost of the expected liability on to the manager/client under a strict liability setting.

We conclude that the desirability of the regimes depends on policymakers' objectives (as well as the feasibility and implementation costs of the regimes, which we do not address). If the objective focuses on maximizing efficiency, measured as the total payoffs, regardless of equity or implementation costs, our results suggest that all regimes may be equally appropriate, at least in the context of this experiment. If the welfare of different constituent groups is of concern, then, the Strict/OOP provides higher welfare to investors at the expense of the auditors. By contrast, the Negligence/IOI regime provides a slightly higher welfare to auditors.

We investigate two possible reasons for subjects' deviations from the theory's point predictions. First, we study the extent to which subjects correctly anticipate their counterparts' actions. We find that subjects' anticipation errors vary across legal regimes. Auditor-subjects anticipate investments most accurately under the Strict/OOP regime, and least accurately under the Negligence/OOP regime. Investors are most accurate under the Negligence/IOI regime. However, auditor-subjects apply the best response least often under the Strict/OOP regime even though they anticipate investment levels most accurately under that regime. These results suggest that although damages under the Strict/OOP regime might seem least predictable for auditors, the low payoffs that auditor-subjects obtained under this regime cannot be attributed to an inability to anticipate damages. Rather, the low welfare auditor-subjects achieved under the Strict/OOP regime is in part due to the higher liability transfers, since every audit failure results in a transfer that is equal to the investment, and cannot be changed by reducing the *ex ante* uncertainty of damage amounts.

Several limitations of this research should be highlighted. First, to operationalize a theoretical model, certain functions and parameter values must be selected. Although we chose functions and parameters consistent with the assumptions of the theory, we do not know how sensitive our findings are to different experimental values. Second, we did not allow auditor-subjects to bid on audit engagements (to simplify the setting for subjects) and, thus, our results on wealth distribution between the audit subjects and investors should be interpreted in light of this limitation. Third, we used student-subjects for our experiment rather than experienced auditors and investors. This may not be a material shortcoming because previous research has shown that student-subjects may be most appropriate for testing models that do not incorporate mundane realism (Ball and Cech 1996). Last, our approach of bisecting deviations into faulty anticipations and/or lack of best responses was done as an *ex post* analysis to attempt to explain the deviations that we found. Thus, the hypotheses on these issues were exploratory, rather than based on specific theories.

Future research could investigate why subjects' ability to anticipate others' actions is not necessarily associated with the ability to respond in an optimal fashion. Such research might employ psychologically based theories, such as fairness or reciprocity. One possible explanation for auditor-subjects to choose actions that are not optimal may be related to prospect theory (Kahneman and Tversky 1979). For example, auditor-subjects face higher damages under the Strict/OOP regime than under the other regimes, and the economic model predicts that subjects will increase audit costs to reduce these damages. However, prospect theory has shown that subjects are risk-seeking in the loss domain, consistent with our finding that auditor-subjects underaudit and face increased risk of damages. Pursuing this explanation may be an avenue for future research. More generally, combining theories from economics and psychology can improve the understanding of how, and why legal regimes affect agent behavior. Other research might investigate how legal regimes affect the behavior of individuals working as members of a group. There is a "public good" aspect to audit quality and liability, and some auditors can free-ride on other members of the group. Thus, future research might investigate how legal regimes can be structured to provide appropriate incentives to groups. Finally, future research could investigate how legal regimes affect auditor independence and investors' reliance on audit reports.

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Audit Committee Composition and Auditor Reporting

Joseph V. Carcello
University of Tennessee
Terry L. Neal
University of Kentucky

ABSTRACT: This study examines the relation between the composition of financially distressed firms' audit committees and the likelihood of receiving going-concern reports. For firms experiencing financial distress during 1994, we find that the greater the percentage of affiliated directors on the audit committee, the lower the probability the auditor will issue a going-concern report. These results support regulators' concern about financial-reporting quality and the recent calls for more independent audit committees.

Key Words: *Audit committee composition, Affiliated directors, Auditor reporting behavior, Going-concern reports.*

Data Availability: *The data are available from public sources. A list of sample firms is available from the second author.*

I. INTRODUCTION

The role of audit committees continues to be of importance to regulators, the accounting profession, and the business community. The New York Stock Exchange (NYSE) and the National Association of Securities Dealers (NASD) recently co-sponsored a Blue Ribbon Committee (BRC) to make recommendations for improving the effectiveness of audit committees (BRC 1999). The NYSE- and NASD-sponsored Blue Ribbon Committee's first recommendation addresses the composition of audit committees and calls for audit committee members to be independent of management.

In this study, we examine the relation between audit committee independence and auditor reporting behavior. For companies experiencing financial distress, we consider the relation between (1) the percentage of audit committee members affiliated with the company (i.e., directors who lack independence), and (2) the likelihood that the auditor will issue a going-concern report. Affiliated directors include current or former officers or employees

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of the company or of a related entity, relatives of management, professional advisors to the company (e.g., consultants, bank officers, legal counsel), officers of significant suppliers or customers of the company, and interlocking directors.[1]

The BRC (1999) and the National Association of Corporate Directors (NACD 1999) both suggest that audit committees are likely to be more effective in protecting the credibility of the firm's financial reporting if committee members are independent of management. For companies experiencing financial distress, we therefore expect that the greater the proportion of the audit committee comprised of affiliated directors, the less the committee will support the auditor in negotiations over the type of audit report to issue.

Our results support this expectation. We find an inverse relation between the likelihood of receiving a going-concern report and the percentage of affiliated directors on the audit committee. This result is robust across numerous model specifications and sensitivity tests. This study provides initial evidence of a relation between one corporate governance mechanism (audit committee composition) and an audit outcome of broad interest, going-concern reporting. Our findings are consistent with the BRC's (1999) recent recommendations for completely independent audit committees.

The remainder of this paper is organized as follows. Section II provides further background and develops the prediction that we test. The research design appears in Section III, and Section IV discusses sample selection and data. The results follow in Section V. Section VI contains a summary and presents the implications and limitations of our findings.

II. BACKGROUND AND EMPIRICAL PREDICTION

Regulators often view independent auditors as "public watchdogs" over Corporate America (Levitt 1998, 5). However, according to Arthur Levitt (1998, 5), chairman of the Securities and Exchange Commission, "even these watchdogs need help in performing their vital role, and that responsibility belongs to the audit committee." Birkett's (1986) historical analysis suggests that audit committees were established primarily to safeguard the independence of the external auditor, and prior research suggests that audit committees strengthen the auditor's position in disputes with management (e.g., Knapp 1987). More recently, Levitt (2000) has indicated that safeguarding the independence of the accounting profession has never been more important.

However, audit committee members do not always perform their duties adequately (POB 1993; Sommer 1991). For example, audit committees may perform inadequately if their members are not independent of management. Members such as affiliated directors may have personal and/or economic dependence on company management (Baysinger and Butler 1985).

Audit Committee Composition and Going-Concern Reporting

Management may pressure the auditor against issuing a going-concern report. Prior research associates modified reports with stock price declines (Jones 1996), difficulty in raising debt capital (Firth 1980), and a perception by management that a modified report may precipitate the company's failure (i.e., the self-fulfilling-prophecy effect) (Mutchler 1984). We therefore expect management to resist a modified report (Mutchler 1984).

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[1] Our definition of an affiliated director is consistent with prior studies (e.g., Beasley 1996; Vicknair et al. 1993; Wright 1996).

Consistent with the extant literature (e.g., Antle and Nalebuff 1991; Knapp 1985; Teoh 1992), we view the issuance of a going-concern report as the outcome of an often contentious negotiation among management, the auditor, and the audit committee. Management may imply that issuing a going-concern report will adversely affect the auditor. For example, clients receiving a going-concern report are more likely to switch auditors (Chow and Rice 1982; Geiger et al. 1998; Mutchler 1984). Other adverse consequences might include increased fee pressure, a reduction in the purchase of nonaudit services, and deterioration in the working relationship with incumbent management.

Prior research suggests that the going-concern reporting decision is one of the most difficult and ambiguous audit tasks (Chow et al. 1987, 129; Carmichael and Pany 1993, 49). Moreover, Salterio and Koonce (1997, 573) find that auditors facing an ambiguous situation are likely to adopt the client's position. Levitt (2000, 5) argues that it is in these "gray areas" where the "temptation to 'see it the way your client does' is subtle, yet real."

The difficulty and ambiguity in the going-concern reporting decision may render the auditor susceptible to management pressure. An independent audit committee could help mitigate such pressure by supporting the auditor in disputes with management (Parker 2000). That is, we expect that an audit committee independent of management is more likely to mitigate any management pressure on auditors to issue a clean opinion when a going-concern report is warranted (McMullen 1996). More specifically, we expect that the greater the percentage of affiliated directors on the audit committee, the lower the likelihood of going-concern reports for financially distressed companies.

III. RESEARCH DESIGN

We test the relation between audit committee composition and auditor reporting using the following logistic regression model:

$$\begin{aligned} \text{REPORT} = {} & b_0 + b_1\text{AFFILIATED} + b_2\text{DEFAULT} + b_3\text{PRIOROPN} + b_4\text{SIZE} \\ & + b_5\text{ZFC} + b_6\text{DEVELOP} + \varepsilon \end{aligned} \tag{1}$$

The variables are defined as follows:

REPORT. The type of audit report issued on the entity's 1994 financial statements (1 = going-concern-modified, 0 = unmodified or modified for a consistency exception).

AFFILIATED. The percentage of audit committee members classified as affiliated directors. We expect a negative relation between the percentage of affiliated directors on the audit committee and the receipt of a going-concern report.

In addition to the independent variable of interest, we control for the effects of other factors that are likely to affect the auditor's propensity to issue a going-concern report: debt default status, prior audit report, company size, level of financial distress, and whether the company is classified as a development-stage company.

DEFAULT. Chen and Church (1992) find that debt default increases the likelihood the auditor will issue a going-concern report.[2] Chen and Church (1992, 31) argue that difficulty in complying with debt agreements, evidenced by missed payments or covenant violations, clarify the company's going-concern problems. Since the auditor is more likely to be blamed for failing to issue a going-concern report after events suggesting that such an opinion may have been appropriate, the cost of failing to issue a going-concern report when a company is in default is particularly high. We therefore expect default to increase the likelihood that the auditor will issue a going-concern report. We use a dummy variable to measure whether the entity is in default before the issuance of the audit report (1 = debt default, 0 = other).[3]

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[2] By adding default status to a going-concern prediction model that contained only financial variables, Chen and Church's (1992) achieved R^2 increased from 38 percent to 93 percent.

PRIOROPN. Mutchler's (1985, 675) interviews with practicing auditors suggest that companies receiving a going-concern opinion in the prior year are more likely to receive the same opinion in the current year. Nogler (1995, 62) finds that after auditors have issued a going-concern opinion a company must show significant financial improvement to receive a clean opinion in a subsequent year. We expect a going-concern report in the prior year to increase the auditor's propensity to issue another going-concern report in the current year. We use a dummy variable to measure whether the entity received a going-concern report in the preceding year (1 = prior year going-concern report, 0 = other).

SIZE. Prior studies find a negative relation between client size and going-concern reports (e.g., Carcello et al. 1995; McKeown et al. 1991; Mutchler et al. 1997). Large companies may be less likely to fail (Carcello et al. 1995, 136), and auditors may hesitate to issue a going-concern report to a large client due to a concern about losing the significant fees that large clients generate (McKeown et al. 1991, 11). We measure SIZE as the natural log of total sales (in thousands of dollars),[4] and we expect a negative relation between client size and receipt of a going-concern report.

ZFC. Prior studies find that the greater the client's financial distress, the greater the probability of receiving a going-concern report (e.g., Carcello et al. 1995; McKeown et al. 1991; Mutchler et al. 1997). We measure financial distress using Zmijewski's financial condition score (ZFC). Specifically, we use Zmijewski's (1984) financial distress prediction model based on: return on assets, financial leverage, and liquidity, and the PROBIT coefficients from his 40 bankrupt/800 nonbankrupt estimation sample. Higher ZFC scores indicate greater financial distress, so we expect a positive relation between ZFC and the receipt of a going-concern report.[5]

DEVELOP. Although we control for the client's financial condition (via ZFC score), Rosman et al. (1999, 39) conclude that "financial information may not truly reflect current activities and may not be predictive of a start-up company's going-concern status." Given the start-up nature of development-stage entities, their financial statements may indicate some degree of distress. The auditor is likely to view the "financial distress" of a development-stage entity as a function of the company's stage in its life cycle rather than as an indication of impending failure. Therefore, after controlling for financial distress level, we expect that development-stage entities will be less likely to receive going-concern reports than will established entities.[6] We identify development-stage entities by examining financial statement headings. Per Statement of Financial Accounting Standards No. 7 (FASB 1975), a development-stage entity must be clearly identified as such in its financial statement headings.

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[3] Consistent with Chen and Church (1992, 35), we classify "in default" a company that: (1) has missed principal or interest payments, (2) has violated debt covenants, if the covenant violation is not waived or if it is waived for a period of less than one year, or (3) is in the process of restructuring debt.

[4] Measuring client size using the natural log of total assets does not affect any of our inferences, except that the DEVELOP variable is no longer significant ($p > 0.10$).

[5] Prior research has used Zmijewski's (1984) weighted probit model to measure financial distress (e.g., Bamber et al. 1993; Carcello et al. 1995).

[6] Given the limited evidence of a relation between development-stage status and going-concern reports, we repeated the analysis excluding the development-stage variable. Our inferences are unaffected.

IV. SAMPLE SELECTION AND DATA

We use the Compact D/SEC database to identify a sample of public companies experiencing financial distress during 1994 (financial institutions are excluded).[7] We focus on distressed companies since prior research indicates that auditors virtually never issue going-concern reports to companies that are not financially distressed (McKeown et al. 1991).[8] However, because auditors' reporting discretion declines when a company has filed for bankruptcy, we exclude companies that filed for bankruptcy before the issuance of the 1994 audit report (n = 14).[9]

Our sample includes only companies whose level of financial distress is high enough to prompt auditors to question the entity's going-concern status. Prior research indicates that auditors are more likely to issue a going-concern report when the probability of failure (calculated from Zmijewski's [1984] financial distress prediction model) exceeds 28 percent (Davis and Ashton 2000; Krishnan and Krishnan 1996).[10] Thus, our sample includes publicly held nonfinancial companies with a probability of failure above 0.28 (based on 1994 financial data) that had not filed for bankruptcy before the audit report, provided that appropriate proxy and financial statement data are available from the Q-Data SEC files.

Table 1 presents the details of our sample selection procedure. Of the 383 companies in our initial sample, almost one-third (117) did not maintain an audit committee and so are excluded from further analysis. Eleven companies are excluded because they were subsidiaries of other sample companies. Since client size (measured in sales) is a control variable, we excluded entities that did not report any sales (n = 10). We excluded seven

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[7] We exclude financial institutions (6000 SIC codes) because most financial distress prediction models (including ZFC) are not designed to predict distress for financial entities.

[8] None of the 96 nonstressed companies (16 of which subsequently filed for bankruptcy) in McKeown et al. (1991, 7) received a going-concern report.

[9] All 14 of these companies received a going-concern report.

[10] We tested the sensitivity of our results to various cutoff probabilities (number of observations): 0.35 (201), 0.50 (165), 0.60 (149), 0.70 (132), 0.80 (115), and 0.90 (92). Our results are robust to the level of financial distress employed since we continue to find that the greater the percentage of affiliated directors on the audit committee, the lower the probability of receiving a going-concern report ($p < 0.01$).

TABLE 1
Sample Description

Initial sample[a]	383
Firms with no audit committee	(117)
Subsidiaries of other sample firms	(11)
Firms with no sales in 1994	(10)
Firms received an audit report modified for non-going-concern reasons	(7)
Prior audit opinion not available	(6)
Foreign companies	(4)
Outliers removed	(3)
No audit opinion issued for 1994	(2)
Final sample	223

[a] The sample frame is defined as publicly held nonfinancial companies that are financially distressed (i.e., probability of failure is greater than 0.28, as derived from Zmijewski's [1984] financial distress prediction model), based on 1994 financial data.

companies that received a modified report for non-going-concern uncertainties and 15 companies for miscellaneous other reasons (the prior audit opinion was not available [n = 6]; foreign companies [n = 4]; outliers [n = 3];[11] and no audit opinion was issued in 1994 [n = 2]). Our final sample includes 223 companies.

To compute the percentage of affiliated directors, we read the following sections of the proxy statements: (1) biographical background of directors and officers, and (2) certain relationships and related transactions. Companies are required to disclose the backgrounds of their directors, including affiliations between the company and the director, in these sections of the proxy statement. Reg. 229.401 of SEC Regulation S-K requires board nominees and directors to disclose family relationships, prior business experience (used to determine if a director was a former officer), and other directorships held (used to determine the existence of an interlocking directorate). In addition, Reg. 229.404 requires disclosure of nominees or directors who have been a member of, or counsel to, law firms the registrant retained during the past year. Also, companies must disclose nominees or directors who are executive officers of suppliers (customers) of the registrant, if the amount of goods or services purchased (sold) exceeds five percent of either party's consolidated gross revenues.

V. RESULTS

Descriptive Statistics

Table 2 presents descriptive statistics, by audit report type, for each of the study's independent variables. Since we later split the percentage of affiliated directors on the audit committee into two components (the percentage of inside directors and the percentage of gray directors), Table 2 also includes descriptive statistics on the percentage of inside directors and gray directors on the audit committee. Inside directors are current officers or employees of the company or of a related entity. Gray directors include former officers or employees of the company or of a related entity, relatives of management, professional advisors to the company (e.g., consultants, bank officers, legal counsel), officers of significant suppliers or customers of the company, and interlocking directors.

Approximately 37 percent (83 out of 223) of the sample companies received a going-concern report. As expected, companies that receive going-concern reports have on average a smaller percentage of affiliated directors on the audit committee ($p < 0.01$). For entities receiving a going-concern report, only 19 percent of audit committee members are affiliated directors. By contrast, almost 40 percent of audit committee members are affiliated directors for entities receiving an unmodified report.

Evidence on the relation between the percentage of inside directors on the audit committee and the type of audit report (going-concern or clean) is mixed: parametric t-tests are insignificant, but the Wilcoxon rank sum test is marginally significant ($p < 0.10$). However, both tests indicate that companies receiving going-concern reports have on average a smaller percentage of gray directors on the audit committee ($p < 0.01$).

As expected, companies that receive a going-concern report are more likely to be distressed (measured by default status, prior audit report, and ZFC index) and smaller ($p < 0.01$). There is no significant negative relation between receipt of a going-concern report and development stage.

Although not reported in a table, we also examine audit committee size and composition for going-concern and unmodified report recipients. Sixty-four percent of the companies

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[11] We deleted three outliers with studentized residuals greater than 3.0 in absolute value. If we include these outliers, we continue to find that the greater the percentage of affiliated directors on the audit committee, the lower the probability of receiving a going-concern report ($p < 0.01$).

TABLE 2
Descriptive Statistics
Mean (Median) [Standard Deviation]

Variable[a]	*Going-Concern Report (n = 83)*	*Clean Report (n = 140)*	*Difference (GC − Clean)*[b]
AFFILIATED	0.19	0.39	−0.20***
	(0.00)	(0.33)	(−0.33)***
	[0.27]	[0.33]	
INSIDE	0.08	0.10	−0.02
	(0.00)	(0.00)	(0.00)*[c]
	[0.19]	[0.20]	
GRAY	0.11	0.29	−0.18***
	(0.00)	(0.25)	(−0.25)***
	[0.20]	[0.32]	
DEFAULT	0.40	0.06	0.34***
	(0.00)	(0.00)	(0.00)***[c]
	[0.49]	[0.25]	
PRIOROPN	0.61	0.09	0.52***
	(1.00)	(0.00)	(1.00)***
	[0.49]	[0.28]	
SIZE	29.53	533.14	−503.61***
	(3.56)	(54.94)	(−51.38)***
	[70.93]	[2,103.25]	
ZFC	4.27	1.17	3.10***
	(2.09)	(0.49)	(1.60)***
	[7.51]	[2.11]	
DEVELOP	0.13	0.05	0.08
	(0.00)	(0.00)	(0.00)
	[0.34]	[0.22]	

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* and *** indicate significance at $p < 0.10$ and $p < 0.01$, respectively, based on one-tailed tests.

[a] Variable definitions:

AFFILIATED = percentage of "affiliated" directors on the audit committee. Affiliated directors include both inside and gray directors as defined below.
INSIDE = percentage of "inside" directors on the audit committee. Inside directors include current employees of the company or of a related party.
GRAY = percentage of "gray" directors on the audit committee. Gray directors include former employees of the company, relatives of management, and directors with other business relationships.
DEFAULT = 1 if firm is in default or in the process of restructuring debt, else 0.
PRIOROPN = 1 if going-concern-modified report in prior year, else 0.
SIZE = total sales (in millions of dollars).
ZFC = Zmijewski's (1984) financial condition index.
DEVELOP = 1 if firm is a development-stage company, else 0.

[b] Tests for differences in the means are based on t-statistics (z-statistics) for continuous variables (proportions). Nonparametric tests for differences in location are based on the Wilcoxon rank sum test.

[c] The Wilcoxon rank sum test does not test whether the medians for the two groups are different. Instead, the test identifies a difference in location, specifically, whether the observations in the two groups are from populations with different medians. Thus, the test indicates a significant difference even though the medians for the two groups are the same.

receiving a going-concern report have audit committees consisting solely of independent directors, but only 31 percent of the companies receiving an unmodified report have fully independent audit committees. There are no noticeable differences in audit committee size between companies receiving going-concern or unmodified reports.

Table 3 presents the correlations among the independent variables. The correlations are quite low, generally below 0.3, except for AFFILIATED, INSIDE, and GRAY, which are correlated by construction. As expected, larger firms are less likely to receive prior going-concern audit reports and are less likely to be in development stage.

Primary Tests

Table 4 presents the results of the logistic regression model used to test the relation between audit committee composition and auditor reporting behavior.[12] The overall model is highly significant ($p < 0.0001$), and the model's pseudo-R^2 is 51 percent. As predicted, the greater the percentage of affiliated directors on the audit committee, the less likely the auditor is to issue a going-concern audit report ($p < 0.01$).[13]

The relations between going-concern reports and the control variables are consistent with prior studies. The likelihood of a going-concern report increases with debt default ($p < 0.01$), a going-concern report in the prior year ($p < 0.01$), and financial distress level ($p < 0.05$). The likelihood of a going-concern report declines with company size ($p < 0.01$), and development-stage status ($p < 0.01$).

Sensitivity Analyses

Our main model (Table 4), controls for key variables where prior literature has documented a relation between the variable and the incidence of going-concern reports. We also performed sensitivity tests controlling for other company and audit firm characteristics that, although not explicitly documented in prior literature, *might* be correlated with both audit committee composition and the incidence of going-concern reports.

Client Industry

There may be a relation between industry and both audit committee composition and the incidence of going-concern reports. Since our sample includes companies from all nonfinancial industry groups, we control for industry by adding two-digit SIC code dummy variables to the model presented in Table 4. In general, the industry dummy variables are not significant ($p > 0.10$),[14] but we continue to find that the greater the percentage of affiliated directors on the audit committee, the lower the probability of receiving a going-concern report ($p < 0.01$).

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[12] Many of our variables, including AFFILIATED, are right-skewed. Although logistic regression is robust to non-normality (Maddala 1983; Stone and Rasp 1991), we use an approach similar to Chen and Church (1992, 38) by truncating observations such that the skewness of the distribution is not greater than three. The only variable affected is ZFC. Our inferences are unaffected by truncating (three) extreme values of ZFC ($p < 0.01$).

[13] We also measure the independence of the audit committee using two alternative dichotomous variables. Using the BRC's (1999) definition, we code the audit committee as nonindependent (1 = nonindependent, 0 = independent) if at least one member of the committee is an affiliated director. Using a much less conservative definition of audit committee independence, we code the audit committee as nonindependent only if a majority of audit committee members are affiliated directors. As expected, we find that auditors are less likely to issue going-concern reports when the audit committee is nonindependent ($p < 0.01$ for both alternative definitions).

[14] Companies in the following SIC codes are marginally more likely to receive going-concern reports: SIC code 35 (industrial and commercial machinery; computer equipment); SIC code 37 (transportation equipment); and SIC code 87 (engineering, accounting, research, management, and public relations services) ($p < 0.10$).

TABLE 3
Correlations among Independent Variables[a,b]

	INSIDE	*GRAY*	*DEFAULT*	*PRIOROPN*	*SIZE*	*ZFC*	*DEVELOP*
AFFILIATED	0.45***	0.80***	−0.11	−0.15**	0.14**	−0.09	−0.11*
INSIDE		−0.16**	0.06	−0.02	0.02	0.01	−0.08
GRAY			−0.16**	−0.18***	0.14**	−0.11*	−0.07
DEFAULT				0.26***	0.00	0.16**	−0.02
PRIOROPN					−0.37***	0.28***	0.25***
SIZE						−0.27***	−0.42***
ZFC							0.12*

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*, **, and *** indicate significance at $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively.

[a] We report Spearman-rank correlation coefficients for discrete variables (DEFAULT, PRIOROPN, DEVELOP) and Pearson correlations otherwise.

[b] Variable definitions:

AFFILIATED = percentage of "affiliated" directors on the audit committee.
INSIDE = percentage of "inside" directors on the audit committee.
GRAY = percentage of "gray" directors on the audit committee.
DEFAULT = 1 if firm is in default or in the process of restructuring debt, else 0.
PRIOROPN = 1 if going-concern-modified report in prior year, else 0.
SIZE = natural log of sales (in thousands).
ZFC = Zmijewski's (1984) financial condition index.
DEVELOP = 1 if firm is a development-stage company, else 0.

Stock Exchange

Since various stock exchanges have differing requirements regarding audit committee composition, there may be a relation between stock exchange and the percentage of affiliated directors on audit committees. The NYSE proscribes company management or employees (a subset of affiliated directors) from serving on the audit committee. NASDAQ's National Market System proscribes members of company management or employees from constituting a majority of the audit committee. The requirements as to audit committee composition for companies traded via AMEX, NASDAQ's Small Capitalization market, or over-the-counter were either less stringent or nonexistent.

We add separate dummy variables to identify companies traded on the NYSE (1 = NYSE-listed company, 0 = other) or traded via NASDAQ's National Market System (1 = NASDAQ National Market, 0 = other) to the model presented in Table 4. Neither the NYSE nor the NASDAQ dummy variable is significant ($p > 0.10$), but we continue to find that the greater the percentage of affiliated directors on the audit committee, the lower the probability of receiving a going-concern report ($p < 0.01$).

Size of Audit Committee

Beasley (1996) finds that the likelihood of fraudulent financial reporting increases with board size. Beasley's (1996) result suggests that smaller audit committees may be more effective than larger committees. If smaller committees are more effective, audit committee size might be associated with a higher incidence of going-concern reports for financially distressed companies.

TABLE 4
Logistic Regression of Going-Concern-Modified Reports on the Percentage of Affiliated Directors and Control Variables

$$REPORT = b_0 + b_1 AFFILIATED + b_2 DEFAULT + b_3 PRIOROPN + b_4 SIZE + b_5 ZFC + b_6 DEVELOP + \varepsilon$$

Variable[a]	*Predicted Relation*	*Estimated Coefficients*	*Standard Errors*	*Wald Chi-Square*
INTERCEPT	none	4.458	1.231	13.119***
AFFILIATED	−	−3.040	0.789	14.825***
DEFAULT	+	2.920	0.612	22.743***
PRIOROPN	+	2.447	0.500	23.970***
SIZE	−	−0.601	0.131	21.185***
ZFC	+	0.138	0.081	2.949**
DEVELOP	−	−1.836	0.767	5.733***

Number of Observations	223
Chi-Square for Model (6 degrees of freedom)	150.857
p-value	0.0001
Pseudo R^2	0.51
Concordant Pairs	93.0%

** and *** indicate significance at $p < 0.05$ and $p < 0.01$, respectively, based on one-tailed tests.

[a] Variable definitions:
AFFILIATED = percentage of "affiliated" directors on the audit committee.
DEFAULT = 1 if firm is in default or in the process of restructuring debt, else 0.
PRIOROPN = 1 if going-concern-modified report in prior year, else 0.
SIZE = natural log of sales (in thousands).
ZFC = Zmijewski's (1984) financial condition index.
DEVELOP = 1 if firm is a development-stage company, else 0.

We add audit committee size to the model presented in Table 4. While audit committee size is not significant ($p > 0.10$), all our other inferences are unaffected.

Audit-Firm Type

Prior research concludes that Big 6 (8) auditors provide higher quality audit service (e.g., DeAngelo 1981; Palmrose 1988). Mutchler et al. (1997, 303) find univariate evidence that Big 6 auditors are more likely than are non-Big 6 auditors to issue going-concern reports to companies experiencing financial distress. Audit committee composition could also affect the type of audit firm selected.

We add audit-firm type (1 = Big 6 auditor, 0 = other) to the model presented in Table 4. Audit-firm type is not significant ($p > 0.10$), but all our other inferences are unaffected.

Audit-Firm Industry Specialization

Large audit firms, in particular, increasingly emphasize industry specialization in their audit practices (Hogan and Jeter 1999). If industry specialists provide higher quality audits, specialists may be more likely to issue going-concern reports to companies experiencing financial distress. In addition, if independent audit committees are more concerned about audit quality, they may also be more likely to select an industry-specialist auditor.

We add to the model presented in Table 4 audit-firm industry specialization measured as a continuous variable: the percentage of industry sales audited by that accounting firm relative to the total industry sales in that same industry. Audit-firm industry specialization is not significant ($p > 0.10$), but we continue to find that the greater the percentage of affiliated directors on the audit committee, the lower the probability of receiving a going-concern report ($p < 0.01$).[15]

Audit-Firm Tenure

Auditors who have long served a particular client may establish close relationships with management that impair the auditors' professional skepticism. A less independent audit committee may also be less likely to challenge or replace an audit firm for diminished professional skepticism.

We add audit-firm tenure (the number of consecutive years that the accounting firm has served as the company's auditor) to the model presented in Table 4.[16] The variable measuring audit-firm tenure is not significant ($p > 0.10$), but we continue to find that the greater the percentage of affiliated directors on the audit committee, the lower the probability of receiving a going-concern report ($p < 0.01$).

Additional Analyses

Partitioning Affiliated Directors into Inside and Gray

Prior literature often distinguishes between insiders and gray affiliated directors (e.g., Vicknair et al. 1993; Wright 1996). To this point, we have treated affiliated directors as a single class, consistent with regulators' current concern that neither inside directors nor gray directors are independent of management. As additional analyses, we consider the relation between auditor reporting behavior and the percentage of: (1) inside directors, and (2) gray directors.

The NYSE has historically proscribed insiders from serving on audit committees, and both the AMEX and NASDAQ have had similar, albeit weaker, requirements. Until recently, none prohibited gray directors from serving on audit committees. However, the major securities exchanges recently adopted the BRC (1999) recommendations that generally proscribe gray directors from serving on audit committees. Therefore, regulators currently view gray directors more like insiders than independent directors. Evidence on the relation between auditor reporting and inside vis-à-vis gray directors may yield insight into whether gray directors are more like independent directors (consistent with previous stock exchange treatment of gray directors) or more like insiders (consistent with the BRC's [1999] recent recommendations).

Table 5 presents the results of our original model except that the percentage of affiliated directors on the audit committee is split into two components: the percentage of inside directors (INSIDE), and the percentage of gray directors (GRAY). As expected, there is a significant negative relation between the percentage of inside directors on the audit committee and the receipt of a going-concern report ($p < 0.01$). Table 5 also reveals a significant negative relation between the percentage of gray directors and the receipt of a going-concern

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[15] We also measure audit-firm industry specialization using two dichotomous measures (Palmrose 1986). We define a firm as an industry specialist if it audits 15 (or 20) percent or more of total industry sales in a particular industry. Neither dichotomous measure of industry specialization is significant, and all our other inferences are unaffected.

[16] This sensitivity test is limited to companies that disclosed the length of auditor tenure in the proxy statement ($n = 111$).

TABLE 5
Logistic Regression of Going-Concern-Modified Reports on the Percentage of Inside and Gray Directors and Control Variables

$$REPORT = b_0 + b_1 INSIDE + b_2 GRAY + b_3 DEFAULT + b_4 PRIOROPN + b_5 SIZE + b_6 ZFC + b_7 DEVELOP + \varepsilon$$

Variable[a]	*Predicted Relation*	*Estimated Coefficients*	*Standard Errors*	*Wald Chi-Square*
INTERCEPT	none	4.469	1.234	13.124***
INSIDE	−	−2.899	1.196	5.879***
GRAY	−	−3.121	0.952	10.756***
DEFAULT	+	2.913	0.613	22.598***
PRIOROPN	+	2.447	0.500	23.957***
SIZE	−	−0.602	0.131	21.178***
ZFC	+	0.137	0.081	2.840**
DEVELOP	−	−1.832	0.767	5.705***

Number of Observations	223
Chi-Square for Model (7 degrees of freedom)	150.880
p-value	0.0001
Pseudo R^2	0.51
Concordant Pairs	93.0%

** and *** indicate significance at $p < 0.05$ and $p < 0.01$, respectively, based on one-tailed tests.

[a] Variable definitions:

INSIDE = percentage of "inside" directors on the audit committee.
GRAY = percentage of "gray" directors on the audit committee.
DEFAULT = 1 if firm is in default or in the process of restructuring debt, else 0.
PRIOROPN = 1 if going-concern-modified report in prior year, else 0.
SIZE = natural log of sales (in thousands).
ZFC = Zmijewski's (1984) financial condition index.
DEVELOP = 1 if firm is a development-stage company, else 0.

report ($p < 0.01$), consistent with regulators' concern that led the BRC to recommend that all audit committee members be completely independent of management.

Interaction between Default Status and Affiliated Directors

The composition of the audit committee should be less important when there is less ambiguity and less need for judgment, and so the going-concern decision is more obvious.[17] The more justification for issuing a going-concern report (1) the less likely management pressure can sway the auditor (i.e., the auditor has less need for the independent audit committee's support), and (2) the less likely affiliated directors are to side with management.

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[17] We are indebted to an anonymous referee for suggesting this reasoning.

Prior literature suggests that default on debt is such an important predictor of whether an auditor issues a going-concern report (e.g., Carcello et al. 1995; Chen and Church 1992), that we expect audit committee composition to have less effect on the auditor's report if the company is already in default. To test this conjecture, we run the model presented in Table 4 after adding an interaction term between debt default status and the percentage of affiliated directors on the audit committee. Since we expect affiliated directors to have less influence when the company is in default, we expect a positive relation between the interaction term and the incidence of going-concern reports.

Consistent with our conjecture that audit committee composition becomes less important when the appropriateness of a going-concern report is more evident, we find that the issuance of a going-concern report is positively associated with the interaction of default status and the percentage of affiliated directors ($p < 0.05$). We also continue to find that the greater the percentage of affiliated directors on the audit committee, the lower the probability of receiving a going-concern report ($p < 0.01$).[18]

VI. SUMMARY, IMPLICATIONS, AND LIMITATIONS

This study presents evidence on the relation between a corporate governance mechanism (audit committee composition) and auditor going-concern reporting behavior. We find that the greater the percentage of affiliated directors on the audit committee, the lower the likelihood of receiving a going-concern report.

Like all research, our study is subject to limitations. Although our results are consistent with the audit committee affecting the audit-reporting process, we document association, not causation. While we run numerous sensitivity tests controlling for other variables that may be correlated with both audit committee composition and auditor reporting behavior, we may not have successfully identified all potential correlated omitted variables.

Notwithstanding these limitations, our results add to the growing body of literature that documents the importance of various corporate governance mechanisms in the financial-reporting process (e.g., Beasley 1996). Our evidence supports regulators' concern that the audit committee should consist entirely of independent, outside directors. Our results also add to the literature that documents adverse effects of certain client characteristics on auditor reporting behavior. Specifically, our results suggest that auditors are less likely to modify the reports of distressed companies that have a greater percentage of affiliated directors on their audit committees.

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[18] We also examine the interaction between ZFC and the percentage of affiliated directors. While the interaction is not significant ($p > 0.10$), we continue to find that the greater the percentage of affiliated directors on the audit committee, the lower the probability of receiving a going-concern report ($p < 0.01$). The interaction term's lack of significance may reflect that auditors are reasonably likely to issue an unmodified report even for companies experiencing high levels of distress. For example, of those companies with a ZFC score above the median (above the 75th percentile), 50.4 percent (38.6 percent) received an unmodified report. By contrast, only 21.4 percent of companies in default received an unmodified report.

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Tax Holidays and Tax Noncompliance: An Empirical Study of Corporate Tax Audits in China's Developing Economy

K. Hung Chan
Lingnan University, Hong Kong
Phyllis Lai Lan Mo
Hong Kong Polytechnic University

ABSTRACT: Many developing economies use tax holidays to attract foreign investment by providing a limited period of tax exemptions and reductions for qualified investors. This paper investigates the effect of tax holidays on foreign investors' tax noncompliance behavior in China's developing economy. We measure noncompliance in terms of tax audit adjustments the Chinese tax authorities require in response to avoidance and evasion. The results indicate that a company's tax-holiday position affects noncompliance. Companies are least compliant before entering a tax holiday, and most compliant while in a tax-exemption period. In addition, domestic market-oriented companies, service-oriented companies, and joint ventures are less compliant than export-oriented companies, manufacturing-oriented companies, and wholly foreign-owned enterprises, respectively.

Our evidence is relevant to policymakers designing tax incentives to attract foreign investors. Our evidence on noncompliance should also help tax authorities and field auditors plan more effective and efficient tax audits. In addition, the results should provide researchers an interesting perspective to study the effect of tax-rate incentives on corporate tax noncompliance.

Key Words: *Tax holidays, Tax noncompliance, Corporate tax audits, Developing economy, Foreign Investment Enterprises (FIEs), China.*

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1. INTRODUCTION

This paper investigates whether a corporate taxpayer's tax-holiday position affects its tax noncompliance behavior. This question is important because many developing countries use tax holidays to attract foreign investment, which is a significant part of their economies.[1] Evidence on noncompliance can help policymakers assess the impact of tax policies on noncompliance, and can help tax authorities plan more effective and efficient tax audits. We measure noncompliance in terms of tax audit adjustments that the Chinese tax authorities require in response to avoidance and evasion.[2]

Because legal requirements protect the confidentiality of corporate tax returns, empirical research on corporate tax noncompliance is limited.[3] A few studies have examined the association between corporate characteristics and tax noncompliance of U. S. corporations. Rice (1992) found that disclosure requirements for publicly traded companies encourage better tax compliance, while marginal tax rates and firm size are positively associated with the absolute level of noncompliance. Based on a questionnaire survey in the U.S., Bradley (1994) suggested that risk of audit adjustment increases compliance, but financial stress decreases compliance. Murray (1995) found that older firms and out-of-state firms are less compliant with U.S. sales tax regulations. Mills (1996, 1998) provided empirical evidence that proposed tax audit adjustments increase as the difference between book and taxable income widens.

We are unaware of any empirical evidence on corporate tax noncompliance in developing economies. U.S.-based studies suggest that tax rates, industry, firm size, firm age, risk of audit adjustment, and financial stress may affect noncompliance. However, other factors such as public disclosure requirements and book-tax differences are irrelevant in our context. In China, most Sino-foreign joint ventures and wholly foreign-owned enterprises are private companies that use tax-based accounting systems. Thus, we examine other corporate characteristics that are likely relevant to foreign investors' noncompliance, including activity orientation (export vs. domestic market-oriented firms), technology status (high-technology vs. other firms), form of investment (joint ventures vs. wholly foreign-owned enterprises), and inside-ownership concentration (Hong Kong- and Taiwan-sourced vs. other firms).

Tax holidays provide a unique setting in which to test the effect of tax-rate incentives on noncompliance. In the U.S., tax-rate differences are typically due to variations in the firms' taxable income levels. However, a firm's taxable income level depends on its avoidance behavior, which tax authorities may not fully detect. Therefore, tax-rate differences in prior U.S. studies are endogenous to avoidance behavior (Mills 1998; Rice 1992; MacKie-Mason 1992). By contrast, the tax-holiday setting establishes different flat tax rates for each holiday position. Tax-rate differences arise because firms are in different tax-holiday positions. These tax-rate differences are exogenous to avoidance behavior once a firm has entered a tax-holiday status. Thus, tax holidays provide a good context for investigating how tax-rate differences affect corporate noncompliance.

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[1] China (Leung 1998), Russia (Hammond and Kozyrenko 1997), India (Sinha 1996), Brazil (Stewart 1998), and Malaysia (Deloitte Touche Tomatsu 1999) all provide tax holidays to attract foreign investment. Many developed countries also provide tax incentives in municipal "Enterprise Zones" (Joy 1993; McFadden-Wade 1996). However, developed countries' advanced infrastructure and political and economic stability often suffice to lure foreign investment without tax incentives.

Foreign investment plays a significant role in developing countries' economies. In China, the gross industrial output of foreign investment enterprises (Sino-foreign joint ventures and wholly foreign-owned enterprises) amounted to 21 percent of the national industrial output in 1997 (SSB 1998, 456). These firms' imports and exports accounted for over 45 percent of national foreign trade in 1997 (SSB 1998). The government would lose significant tax revenue if these enterprises engage in massive tax evasion and avoidance.

[2] Chinese tax authorities consider all noncompliance as avoidance or evasion. All noncompliance is subject to penalty, and authorities do not normally differentiate between avoidance and evasion. While tax evaders can be prosecuted and jailed, the government typically levies monetary penalties.

[3] Compliance research has focused on the behavior of individuals. Corporate tax noncompliance requires multiple parties to behave strategically, so it is more complicated than individual tax evasion. Therefore, evidence on individual tax noncompliance behavior cannot be directly generalized to explain corporate tax noncompliance.

We collected and analyzed 583 tax audit cases on corporate tax noncompliance by foreign investors in China. Chinese tax authorities provided this unique data set for academic research. We find that the corporate taxpayer's tax-holiday position significantly affects noncompliance. Companies in the pre-holiday position are least compliant. By contrast, companies are most compliant in the tax-exemption period that has a zero tax rate and a relatively heavy penalty for evasion. Domestic market-oriented companies have a larger detected noncompliance than their export-oriented counterparts. Joint ventures and service-oriented companies also appear to be less compliant, on average, than wholly foreign-owned and manufacturing-oriented companies.

The results of this research are relevant to public policymakers, tax authorities, field auditors, and researchers interested in international accounting. First, the results should be of interest for public policymakers designing foreign investment policies and tax incentives in developing countries. Second, they can help tax authorities and field auditors plan more effective and efficient audits. For example, given the high level of noncompliance in the pre-holiday period, policymakers may consider limiting the pre-holiday period, and tax authorities may intensify audit scrutiny for firms in this period. Third, since firms in different tax-holiday positions have different tax rates, the results provide researchers an interesting perspective in studying the effect of tax-rate incentives on corporate tax noncompliance. Finally, although the findings pertain to China—the largest developing country—empirical evidence on how tax-holiday position and other corporate characteristics affect compliance should provide a useful reference for other developing countries.

The next section explains the institutional background of tax audits in China. Section III formulates the research hypothesis. Section IV outlines the research methodology, Section V presents the empirical test results, and Section VI concludes.

II. INSTITUTIONAL BACKGROUND OF TAX AUDITS IN CHINA

Tax Incentives in China

To attract foreign capital, advanced technology, and modern management techniques, China grants foreign investment enterprises (FIEs), which include Sino-foreign joint ventures and wholly foreign-owned enterprises, various tax incentives to invest in designated locations and preferred industries. For example, enterprises established in Special Economic Zones, the Pudong New Development Zone in Shanghai, and Economic and Technological Development Zones, enjoy a *flat* tax rate of 15 percent (the normal *flat* tax rate is 30 percent) (NPC 1991, Article 7). Manufacturing-oriented enterprises scheduled to operate for ten years or more are entitled to a tax holiday, which exempts them from income tax in the first two profit-making years, followed by a 50 percent reduction over the next three years (NPC 1991, Article 8). Enterprises with advanced production technology or an export orientation also receive a 50 percent tax reduction for additional years after the initial five-year tax holiday expires (State Council 1991, Article 75).

Tax Audits in China

FIEs in China engage in significant tax evasion and avoidance. Chinese tax authorities discovered a total tax evasion of RMB 4,200 million (approximately U.S. $506 million) in over 20 provinces and cities, through the audit of 47,000 FIEs, representing 25 percent of the operating FIEs in 1991–1995 (Dong 1998). Because such evasion leads to significant revenue loss, the Chinese government issued proclamations designed to boost the revenue collected from foreign enterprises. *Detailed Procedures Regarding Tax Audits of Foreign Taxpayers* (SAT 1993a) requires Chinese tax authorities to conduct an annual tax audit on all FIEs, subject to practical resource constraints. Our study focuses on this regular annual tax audit, which covers all income-tax noncompliance.[4] Tax auditors examine details of items reported on tax returns. When special complexities arise, such as transfer-pricing manipulations and politically sensitive matters, tax authorities conduct special audits. Special investigations are relatively rare,[5] but when they occur, they replace the FIE's regular annual audit.

In principle, all FIEs are subject to annual tax audits. However, because of insufficient manpower, the government's goal is to audit at least 30 percent of FIEs each year. Most large tax bureaus have developed computer programs to classify enterprises into three audit classes (Huang 1996). Class A designates "good" enterprises that tax authorities will audit every two years. Most enterprises are classified in Class B. These enterprises are subject to annual audit if sufficient resources are available. Tax authorities will not audit Class C enterprises, as their books are considered unreliable. Class C enterprises must pay tax at an assessed amount regardless of their reported profits.

The regulation (SAT 1993a) outlines the content and scope of an investigation, audit procedures, and documentation of misstatements made by audited FIEs. The Appendix summarizes the general procedures followed in each annual tax audit.

Tax authorities make audit adjustments to taxable income to correct any misstatements detected in tax audits. Misstatements include errors or irregularities resulting from noncompliance with tax rules and regulations. For example, management fees and royalties paid to associated enterprises are not deductible, while entertainment expenses, bad debts, and depreciation are subject to various deduction limits. Audit adjustments also correct misstatements from underreporting sales revenue, overstating cost of sales, deducting expenses without proper supporting invoices, and other violations of Chinese regulations.

III. HYPOTHESIS DEVELOPMENT

In this section, we develop a hypothesis about the impact of the tax-holiday position on tax noncompliance by FIEs. We measure tax noncompliance as the magnitude of the tax audit adjustment required by Chinese tax authorities, relative to sales revenue. We also identify and control for other corporate characteristics that may affect FIE's tax noncompliance.

Tax-Holiday Position

China grants a tax holiday to certain FIEs in their early years of operation. FIEs planning to engage in manufacturing operations for at least ten years qualify for a "two-year exemption and three-year concession" tax holiday. The concession is a 50 percent reduction of the applicable tax rate. FIEs engaged in service industries generally do not qualify for the tax holiday. However, in special circumstances, service-oriented FIEs such as those located in special zones with an invested capital not less than U.S. $5 million and a planned operation period of ten years or more, may enjoy a "one-year exemption and two-year concession" tax holiday.

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[4] The regular annual tax audit regulation (SAT 1993a) applies only to foreign investment enterprises. Domestic Chinese enterprises are not subject to the same audit because most are directly or indirectly owned by the state. Profits of state-owned enterprises belong to the government, and enterprise management includes representatives from the ruling party to help oversee operations, so tax authorities do not see a great need to audit state-owned enterprises. In addition, China governs domestic enterprises under different income tax laws, and does not grant them tax holidays. Therefore, tax audits of domestic and foreign enterprises are not comparable.

[5] Tax authorities conducted 200 special investigations on transfer pricing in coastal China during 1992–93 (Chan and Chow 1997, 1998). In 1996, there were only 300 special audits on transfer pricing and nine other special investigations on tax evasion (Xiang 1997). By contrast, authorities conducted about 19,000 regular annual tax audits in 1994, the first year of the required annual audit (Xiang 1996).

The tax holiday begins with the "first profit-making year." This is the first year after the start of operations in which the firm makes a profit after offsetting losses accumulated since the business started. The first profit-making year is the first tax-exempt year.

FIEs normally make little or no profit in their first few years of operation. However, if they do make a small profit, this triggers the start of the tax holiday, and only this "small profit" is exempt from tax. Thus, FIEs have incentives to exaggerate losses during the pre-holiday period to delay the start of tax holiday. Delaying the first profit-making year not only reduces the total tax payable in nominal terms, but also increases savings by deferring cash outflow.

FIEs in the tax-exemption period have no immediate incentive to underreport taxable income, as they are exempt from tax (although they can carry a loss incurred in the second tax-exemption year forward to the tax-reduction period). Tax authorities penalize any detected noncompliance at the normal tax rate (15 percent for FIEs in special zones) plus a penalty factor (up to 500 percent, but usually 10 to 20 percent of the tax owed), regardless of the FIE's tax position (SAT 1996). Therefore, evasion is generally not worthwhile during the exemption period. During the tax-reduction period, FIEs have more motivation to misstate taxable income, though the tax rate is comparatively low. When the tax-holiday period expires, FIEs pay taxes at the normal rate, so they have more incentives to understate taxable income. Thus, we expect larger tax adjustments after the tax-holiday period expires.

We classify FIEs into four tax-holiday positions: before tax-holiday, during tax-exemption, during tax-reduction, and after tax-holiday. The following hypothesis summarizes our expectation for the magnitudes of tax audit adjustments for FIEs in these four different tax-holiday positions.

Hypothesis: The magnitudes of tax audit adjustments vary for FIEs in different tax-holiday positions. Specifically, audit adjustments in the pre- and post-holiday periods are greater than those in the tax-reduction period, which, in turn, are greater than those in the tax-exemption period.

Control Variables

We next consider corporate characteristics that may affect FIE's tax noncompliance: activity orientation (export-oriented vs. domestic market-oriented), technology status (high-technology vs. others), industry affiliation (manufacturing-oriented vs. service-oriented), form of investment (joint ventures vs. wholly foreign-owned enterprises), and inside-ownership concentration (Hong Kong- and Taiwan-sourced vs. others).

Activity Orientation (Export-Oriented vs. Domestic Market-Oriented FIEs)

To encourage exports, China grants a 50 percent tax reduction after the normal five-year tax holiday expires to export-oriented FIEs that export at least 70 percent of their products in any year (in terms of sales revenue, as verified by the Bureau of Economic Development) (State Council 1991, Article 75(1)).[6] The tax-favored treatment reduces export-oriented FIEs' incentives to underreport taxable income. Further, it is more difficult to audit export-oriented FIEs because their activities tend to be more diversified and the bookkeeping practices for inter-jurisdictional transactions including foreign currency transactions are more complicated. Thus, we expect smaller tax adjustments for export-oriented FIEs.

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[6] At the time of incorporation, export-oriented FIEs must state their export orientation and provide a detailed operation plan in a feasibility report approved by the government.

Technology Status (High-Technology vs. Other FIEs)

Like other developing countries, China encourages investment involving new/high technology. China grants a 50 percent tax reduction for an extended three-year period after the initial tax concessions for FIEs that the tax authorities accept as "technologically advanced enterprises" (State Council 1991, Article 75(8)). "Technologically advanced enterprises" use advanced techniques, technology, and equipment, and their products are either in short supply or newly developed in China. The additional tax relief reduces high-technology FIEs' incentives to misstate taxable income.

In addition, since attracting advanced technology is a priority for the Chinese government, tax authorities are reluctant to intensively audit high-technology companies in order to reduce the risk of losing these firms to other jurisdictions (Chan and Chow 1997). Thus, we expect smaller tax adjustments for high-technology companies.

Industry Affiliation (Manufacturing-Oriented vs. Service-Oriented FIEs)

Most manufacturing-oriented FIEs qualify for the five-year tax holiday, i.e., a two-year exemption and three-year reduction. In contrast, only a few service-oriented FIEs qualify for a one-year exemption and two-year reduction holiday. Manufacturing-oriented FIEs thus have less incentive to underreport taxable income. It is also more difficult for Chinese tax authorities to detect misstatements in production costs. The regulation (SAT 1993a) requires tax officials to verify production costs based only on an enterprise's documents and ledgers—they seldom use analytical procedures to test reasonableness. For these reasons, we expect smaller tax adjustments for manufacturing-oriented enterprises than for service-oriented FIEs.

Form of Investment (Joint Ventures vs. Wholly Foreign-Owned Enterprises)

Although foreign investment has played an important role in China's evolution toward a market economy, the government is concerned about foreign exploitation. For most joint ventures, the Chinese partners are state-owned enterprises in which the government expects to play a monitoring role by appointing Chinese managers (Chan and Chow 1997). This is one of the major reasons that China prefers joint ventures over wholly foreign-owned enterprises. However, the basic salary of Chinese managers in joint ventures is relatively low, as it is linked to the pay scale of their state-owned enterprises. In recent years, the reward system has changed to link managers' pay through a bonus scheme to the joint venture's performance (Lee and McNally 1997). Given Chinese managers' low salaries, the bonus is an important part of their income. FIEs' bonus schemes often reward improving cash flow and reducing costs (EIU 1999). Tax avoidance provides one way to achieve these objectives, as tax is both a cash outflow and an extra cost. Chinese managers may therefore have incentives to collaborate with foreign managers to manipulate financial reports. That is, some Chinese managers are not playing the monitoring role the government expects them to play.

Nevertheless, Chinese managers in joint ventures often have close connections with government officials, including tax officials. The presence of a Chinese manager appointed by an influential person from a large state-owned enterprise facilitates a joint-venture's communication with tax authorities. Studies in the U.S. indicate that contact with tax authorities increases compliance among individuals (Witte and Woodbury 1985). However, there is no empirical evidence on whether such contact increases corporate taxpayers' compliance.

In summary, the net effect of Chinese managers' monitoring and contact with tax authorities on joint-ventures' compliance is ambiguous. Thus, we have no directional expectation for this control variable.

Inside-Ownership Concentration (Hong Kong- and Taiwan-Sourced vs. Other FIEs)

Previous research has examined the relation between inside-ownership concentration and earnings manipulation. Klassen (1997) suggests that closely held companies can efficiently inform shareholders of firm value through channels other than audited financial statements. To the extent that it is less costly to reduce both reported earnings and taxes, managers of closely held companies are likely to be more aggressive tax planners. In addition, many closely held companies are managed by owners who often hold a large percentage interest in the company. This environment creates more incentives for tax evasion.

FIEs from Hong Kong and Taiwan are often closely held, owner-managed family businesses (Liu 1999), while non-Chinese enterprises from the U.S. and Japan are mainly subsidiaries of widely held, employee-managed multinational corporations. Since information about the inside ownership structure of FIEs is not available, we use the source of the FIE as a proxy. Thus, Hong Kong- and Taiwan-sourced FIEs are proxies for firms with higher inside-ownership concentration, and we expect these FIEs to be less compliant than non-Chinese FIEs.

IV. RESEARCH DESIGN

Data Collection

We collected tax audit data from the tax bureaus of selected Chinese coastal areas that enjoy large foreign investment. Income tax revenues from FIEs in the areas contribute over 50 percent of the total collected from all FIEs in China in 1996. The selected FIEs are subject to the same reduced tax rate of 15 percent. These areas offer the same tax holidays in terms of tax exemption and a 50 percent reduction of applicable tax rates for manufacturing-oriented, technologically advanced, and export-oriented enterprises.

The tax bureaus agreed to provide cases of FIEs audited in 1997 for calendar year 1996 tax returns. We requested cases from the Class B category only, because this class represents the majority of FIEs. This selection also provides a control as all sample firms belong to the same audit-risk class. During the data collection from the audit files, a researcher was present to observe and answer any questions the officials had. The tax bureaus selected cases at random and there was no indication that they intentionally included or excluded particular cases in the sample. Therefore, the sample companies should be reasonably representative of FIEs in China with similar corporate characteristics.

We collected a total of 585 audit cases. Of those, 147 had zero adjustment (no change in taxable income). The other 438 had positive adjustments (an increase in taxable income). We excluded two cases with zero sales, which left a final sample of 583 cases.

The general guidelines for tax audits in China (SAT 1993a) require tax auditors to record in a tax audit report details of any misstatements found in each audit and the related adjustments. After review and approval, the tax bureau sends an official written notice to the audited FIE, specifying the nature and the amount of the adjustments.

Tax officials collected the following data directly from the tax audit reports:

(1) Details of individual adjustments, including the types of the expense or revenue adjusted, the amount of each adjustment, the effect of the adjustment (increase or decrease) on taxable income, and the accounts affected.

(2) Reasons for the adjustments. These include expenses exceeding the legal limit, nonallowable expenses, unreported and underreported revenue, and overstatement of the cost of sales.
(3) Reported profit or loss.
(4) Adjusted taxable income after tax audit.
(5) Sales revenue.
(6) Tax status of the FIE, such as the applicable tax rate for the year audited, and the tax exemption or reduction, if any.
(7) Additional tax owed, if any.

Tax officials obtained the FIEs' demographic information by matching the FIE's file number in the tax audit report with the general background file in the tax bureau.

Hypothesis Tests

We first conduct a univariate analysis to compare mean tax audit adjustments across the four tax-holiday positions. We then use multiple regression analysis to test the hypothesized relations. We measure tax noncompliance using tax audit adjustments deflated by sales revenue. We deflate by sales revenue because most of the tax adjustments concern expenses that are related to the level of the firm's activity. We subject the dependent variable to a log transform to control for heteroskedasticity. For firms with zero adjustment, we changed that figure to one Renminbi (RMB, the Chinese currency) to avoid taking the log of zero.

To analyze the effect of tax holidays on noncompliance, we classified FIEs into four groups based on their tax-holiday positions as filed in their tax returns: (1) FIEs before their first profit-making year, (2) those in the tax-exemption period, (3) those in the tax-reduction period, and (4) those after the tax holiday.[7] FIEs ineligible for tax holidays are classified into the same group as FIEs that are beyond their tax holidays. Both types of FIEs are subject to the same tax rate, so they should have similar incentives for tax noncompliance. To test the hypothesis, we estimate the following regression:

$$\begin{aligned}\text{Log(ADJ/SALES)} = {} & \beta_0 + \beta_1\text{PRE-HOLIDAY} + \beta_2\text{TAX-REDUCTION} \\ & + \beta_3\text{POST-HOLIDAY} + \beta_4\text{EXPORT} + \beta_5\text{TECHNOLOGY} \\ & + \beta_6\text{MANUFACTURING} + \beta_7\text{JOINT-VENTURE} \\ & + \beta_8\text{HONGKONG-TAIWAN} + \varepsilon\end{aligned}$$

where:

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[7] After their initial five-year tax holiday, "export-oriented" FIEs must pay tax at the normal rate when they file their tax returns. However, if they have exported 70 percent in the tax year, they can receive a 50 percent tax refund. The tax refund is not certain. During the tax year, the FIEs cannot be sure whether they will meet the target. After year-end, the Bureau of Economic Development verifies their total sales and export sales. This process is usually lengthy (six to nine months after year-end) and FIEs must submit proper documentation for verification. Many refund requests have been rejected due to inadequate documentation and year-end-cutoff problems. Thus, we classify such "export-oriented" FIEs in the post-holiday position.

In contrast, the Bureau of Economic Development normally approves FIE's high-technology status at the time of their incorporation. For three years after the initial five-year tax holiday, high-technology FIEs enjoy a 50 percent tax reduction when they file their returns. We classify such high-technology FIEs under the tax-reduction period.

Dependent Variable:

Log(ADJ/SALES) = natural logarithm of tax audit adjustment deflated by sales revenue.

Independent Variables of Interest:

PRE-HOLIDAY = 1 if an FIE is in the pre-holiday position, 0 otherwise;
TAX-REDUCTION = 1 if an FIE is in the tax-reduction position, 0 otherwise;
POST-HOLIDAY = 1 if an FIE is after (or does not have) a tax holiday, 0 otherwise;

Control Variables:

EXPORT = 1 if an FIE is an export-oriented enterprise that qualifies for export tax preference, 0 otherwise;
TECHNOLOGY = 1 if an FIE is a high-technology enterprise that has been accepted as a "technologically advanced enterprise," 0 otherwise;
MANUFACTURING = 1 if an FIE is a manufacturing-oriented enterprise per the industry code used in the tax audit report, 0 otherwise;
JOINT-VENTURE = 1 if an FIE is a joint venture, 0 otherwise; and
HONGKONG-TAIWAN = 1 if an FIE is sourced from Hong Kong or Taiwan (a proxy for high-inside-ownership concentration), 0 otherwise.

The three tax-related dummy variables, PRE-HOLIDAY, TAX-REDUCTION, and POST-HOLIDAY, capture the incremental effects of these tax-holiday positions relative to the tax-exemption position that is reflected in the intercept.

V. EMPIRICAL RESULTS

Descriptive Statistics

Table 1 provides descriptive statistics for the study's independent and dependent variables. Panel A shows that about half (47 percent) of the sample FIEs are enjoying tax holidays (exemption and reduction), while the other half (53 percent) of the sample firms are outside the tax-holiday periods (pre- and post-holiday). Panel B describes the corporate characteristics of the FIEs, while Panel C reports the descriptive statistics for tax audit adjustments. The mean audit adjustment as a percentage of sales (ADJ/SALES) is 3.8 percent for the full sample and 5.0 percent for the noncompliant subsample. The sample firms' mean sales average RMB 91 million (approximately U.S. $11 million).

Further analysis of audit data on the types of tax audit adjustments (not tabled) reveals that the largest adjustment in the pre-holiday period is overstatement of cost of sales. During initial operations, the cost accounting process is not usually well established, which leads to more adjustments for cost of sales. Entertainment and depreciation expenses that exceed the legal limits are the largest adjustments in the exemption and reduction periods, respectively. Finally, over-provision for staff welfare is the largest adjustment in the post-holiday period. Since the guidelines for the staff welfare provision are rather complicated and subject to negotiation with local tax authorities, firms try to claim larger expenses when the tax rate is high, as in the post-holiday period.

Univariate Statistics

The following chart summarizes the noncompliance behavior of FIEs in different tax-holiday positions (data based on Panel C of Table 1):

	Pre-Holiday	*Exemption*	*Reduction*	*Post-Holiday*
Rate of noncompliance	80.56%	58.44%	76.53%	76.89%
Mean audit adjustment	9.39%	0.94%	3.04%	3.54%

TABLE 1
Descriptive Statistics for Independent and Dependent Variables Used in Statistical Analyses

Panel A: Independent Variables—Tax-Holiday Variables

Variables[a]	*No. of Firms*	*Percentage of the Sample*
PRE-HOLIDAY	72	12.4
TAX-EXEMPTION	77	13.2
TAX-REDUCTION	196	33.6
POST-HOLIDAY	238	40.8
Total	583	100.0

Panel B: Independent Variables—Control Variables

Variables[a]	*Category*	*Value*	*No. of Firms*[c]	*Percentage of the Sample*[c]
EXPORT	Export-oriented	1	308	52.8
	Domestic market-oriented	0	275	47.2
TECHNOLOGY	High-technology	1	138	23.7
	Others	0	445	76.3
MANUFACTURING	Manufacturing-oriented	1	514	88.2
	Service-oriented	0	69	11.8
JOINT-VENTURE	Joint venture	1	322	55.2
	Wholly foreign-owned	0	261	44.8
HONGKONG-TAIWAN	Hong Kong- and Taiwan-sourced	1	362	62.1
	Others	0	221	37.9

(Continued on next page)

TABLE 1 (Continued)

Panel C: Tax Audit Adjustments

		Compliant Firms			*Noncompliant Firms*[b]			*All Firms*		
Variable[a]	*Tax-Holiday Position*	*n*	*Mean*	*Std. Deviation*	*n*	*Mean*	*Std. Deviation*	*N*	*Mean*	*Std. Deviation*
ADJ/SALES	Pre-holiday	14	0	0	58	0.1166	0.2413	72	0.0939	0.2212
	Tax-exemption	32	0	0	45	0.0161	0.0467	77	0.0094	0.0364
	Tax-reduction	46	0	0	150	0.0397	0.1494	196	0.0304	0.1317
	Post-holiday	55	0	0	183	0.0460	0.1409	238	0.0354	0.1250
	Total	147	0	0	436	0.0501	0.1567	583	0.0375	0.1372

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[a] Variable definitions:

PRE-HOLIDAY = 1 if an FIE (Foreign Investment Enterprise) is before the first profit-making year, 0 otherwise;
TAX-EXEMPTION = 1 if an FIE is within tax-exemption period, 0 otherwise;
TAX-REDUCTION = 1 if an FIE is within tax-reduction period, 0 otherwise;
POST-HOLIDAY = 1 if an FIE is after tax holiday or does not have tax holiday, 0 otherwise;
EXPORT = 1 if an FIE is an export-oriented enterprise, 0 otherwise;
TECHNOLOGY = 1 if an FIE is a high-technology enterprise, 0 otherwise;
MANUFACTURING = 1 if an FIE is a manufacturing-oriented enterprise, 0 otherwise;
JOINT-VENTURE = 1 if an FIE is a joint venture, 0 otherwise;
HONGKONG-TAIWAN = 1 if an FIE is sourced from Hong Kong or Taiwan (a proxy for high-inside-ownership concentration), 0 otherwise;
ADJ/SALES = tax audit adjustment deflated by sales revenue.

[b] "Noncompliant Firms" denotes firms with positive tax audit adjustments. The percentage of noncompliant firms (the rate of noncompliance) in each tax-holiday position is 80.56 percent, 58.44 percent, 76.53 percent, and 76.89 percent for pre-holiday, tax-exemption, tax-reduction, and post-holiday position, respectively.

[c] The total number of sample firms (583) is distributed across the two categories for each of the variables as shown, with the corresponding percentages equal to 100 percent.

The rate of noncompliance is highest in the pre-holiday period and lowest in the exemption period. As hypothesized, the mean audit adjustments as a percentage of sales revenue in the pre- and post-holiday periods are greater than those in the tax-reduction period, which in turn are greater than those in the tax-exemption period.

Table 2 reports univariate statistical tests comparing mean audit adjustments over the four tax-holiday positions. The overall F-test rejects the equality of the means at the 0.05 level, consistent with the hypothesis that tax-holiday positions affect FIEs' noncompliance. The multiple comparison tests indicate that firms are least compliant in the pre-holiday position and most compliant in the tax-exemption position, consistent with our hypothesis. However, we find no significant difference between the tax-reduction and post-holiday positions.

Further analysis indicates that for the FIEs reporting (pre-audit) losses, tax audit adjustments are most likely to transform those losses into profits for firms in the pre-holiday period. The audit adjustment transforms losses into profits for 18 percent, 0 percent, 4 percent and 3 percent, of the (pre-audit) loss-making FIEs in pre-holiday, tax-exemption, tax-reduction and post-holiday positions, respectively. Furthermore, the tax audit adjustment transferred 10 percent of the firms (seven firms) in the pre-holiday period to the tax-exemption period. The average noncompliance (i.e. audit adjustment/sales) for these seven firms was 23.8 percent, as opposed to an average of 7.8 percent for other firms in the pre-holiday period, and 3.8 percent for the overall sample. Thus, FIEs in the pre-holiday position often manipulate taxable income by exaggerating losses before their first profit-making year, so as to extend their tax holiday.

Results of Regression Analysis

Table 3 shows the results of the multiple regression analysis. The overall regression model is significant at the 0.05 level.[8] All of the tax-holiday variables are significantly positive at the 0.05 level, suggesting that the tax audit adjustment in the exemption period is significantly smaller than in other tax-holiday periods. A Wald coefficient test (*EViews 3 User's Guide* 1998) indicates that the coefficient for PRE-HOLIDAY (4.545) is significantly higher than the coefficients for TAX-REDUCTION (2.611) and POST-HOLIDAY (2.623) at the 0.05 level, but the latter two coefficients are not significantly different from each other. Consistent with the univariate analysis, these regression results on the whole support our hypothesis. Specifically, tax audit adjustments in the pre-holiday period are significantly greater than are those in other holiday periods. Tax audit adjustments in the post-holiday and tax-reduction periods are also significantly greater than those in the tax-exemption period. However, contrary to our expectation, audit adjustments in the post-holiday period are not significantly greater than those in the tax-reduction period.

Our univariate and multiple regression evidence on noncompliance in tax-exemption, tax-reduction, and post-holiday periods, is generally consistent with prior research concluding that higher tax rates lead to less compliance. However, we find that noncompliance is highest in the pre-holiday period even though the tax rate is technically zero. In this circumstance, firms not only consider the current period's tax position, but also their evasion strategy considers the total tax burden over multiple future periods.

Table 3 also shows that EXPORT, MANUFACTURING, and JOINT-VENTURE play significant incremental roles in explaining the magnitude of the tax audit adjustments. As

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[8] Variance inflation factors are all less than 2, indicating that multicollinearity is unlikely to affect our inferences. White's heteroskedasticity test (Gujarati 1999) suggests that the homogeneous variance assumption was not rejected at the 0.05 level.

TABLE 2
Univariate Comparisons of Tax Audit Adjustments in Different Tax-Holiday Positions

		Post Hoc Tests[a]	
Tax-Holiday Position	*Tax-Holiday Position*	*Mean Difference in Log(ADJ/SALES)*[b]	*p-value*
Pre-holiday (T1)	Tax-exemption (T2)	T1 − T2 = 4.5178	0.00
	Tax-reduction (T3)	T1 − T3 = 1.9702	0.01
	Post-holiday (T4)	T1 − T4 = 1.5848	0.03
Tax-exemption (T2)	Tax-reduction (T3)	T2 − T3 = −2.5477	0.00
	Post-holiday (T4)	T2 − T4 = −2.9330	0.00
Tax-reduction (T3)	Post-holiday (T4)	T3 − T4 = −0.3854	0.46

One-way analysis of variance on the differences among four means (T1, T2, T3, T4): F statistic = 9.379 (p = 0.00)

[a] We used the Least Significant Difference test (Norusis 1996) for the pairwise comparison. We also conducted a pairwise comparison based on the Bonferroni test, which controls for overall error rate (Norusis 1996). The result is identical to the Least Significant Difference test except that T1 − T4 is not significant.
[b] Log(ADJ/SALES) = natural logarithm of tax audit adjustment deflated by sales revenue.

expected, export-oriented FIEs have a smaller detected noncompliance than their domestic market-oriented counterparts ($p < 0.05$). Industry affiliation and form of investment are marginally significant at the 0.10 level. As expected, manufacturing-oriented FIEs have smaller audit adjustments, and we also find that joint ventures are, on average, less compliant than wholly foreign-owned enterprises.

We conducted additional tests to check the robustness of the regression results. First, we conducted a TOBIT analysis (*EViews 3 User's Guide* 1998). Second, we reran the regression with all zero audit adjustments excluded. Third, we reran the regression without the logarithmic transformation, using White's procedure (Gujarati 1999) to correct for heteroskedasticity. Fourth, we reran the regression with an additional control variable to account for the profit or loss status of the firm. Fifth, we conducted an analysis of variance (ANOVA). The significance of the tax-holiday variables remains the same in all of the robustness tests, whereas the marginally significant MANUFACTURING and JOINT-VENTURE control variables are not significant in two of the five tests. Finally, we reran the regression with the "post-holiday export-oriented" FIEs reclassified into the tax-reduction period (see footnote 7). All the tax-holiday variables remain significant, but the EXPORT variable is no longer significant.

VI. SUMMARY AND CONCLUSION

Developing countries rely on foreign investment to help develop their economies.[9] Many use tax holidays as an incentive to attract foreign investment. This study provides empirical evidence that a firm's tax-holiday position affects its noncompliance. Firms are least compliant during the pre-holiday period and most compliant during the tax-exemption period. Therefore, public policymakers may want to consider redesigning tax holidays to

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[9] In 1999, developing countries (including transitional economies) comprised 85 percent of the world's population, but only 43 percent of its GDP (IMF 2000).

TABLE 3
Regression Results for the Effect of Tax-Holiday Position on Tax Noncompliance

$$\textit{Model: } Log(ADJ/SALES) = \beta_0 + \beta_1 PRE\text{-}HOLIDAY + \beta_2 TAX\text{-}REDUCTION + \beta_3 POST\text{-}HOLIDAY + \beta_4 EXPORT + \beta_5 TECHNOLOGY + \beta_6 MANUFACTURING + \beta_7 JOINT\text{-}VENTURE + \beta_8 HONGKONG\text{-}TAIWAN + \varepsilon$$

	Predicted Sign	*Regression Coefficient*	*t-statistic*	*p-value*
Intercept	NA	−8.502	−9.021	0.00
Independent variables of interest:[a]				
PRE-HOLIDAY	+	4.545	5.213	0.00
TAX-REDUCTION	+	2.611	3.630	0.00
POST-HOLIDAY	+	2.623	3.627	0.00
Control variables:[a]				
EXPORT	−	−1.401	−2.613	0.01
TECHNOLOGY	−	−0.301	−0.473	0.64
MANUFACTURING	−	−1.310	−1.738	0.08
JOINT-VENTURE	?	0.771	1.625	0.10
HONGKONG-TAIWAN	+	−0.504	−1.067	0.29
Sample size	583			
F-value	6.905 (p-value = 0.00)			
Adjusted R^2	7.5%			

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[a] Variable definitions:

Log(ADJ/SALES) = natural logarithm of tax audit adjustment deflated by sales revenue;
PRE-HOLIDAY = 1 if an FIE (Foreign Investment Enterprise) is before the first profit-making year, 0 otherwise;
TAX-REDUCTION = 1 if an FIE is within tax-reduction period, 0 otherwise;
POST-HOLIDAY = 1 if an FIE is after tax holiday or does not have tax holiday, 0 otherwise;
EXPORT = 1 if an FIE is an export-oriented enterprise, 0 otherwise;
TECHNOLOGY = 1 if an FIE is a high-technology enterprise, 0 otherwise;
MANUFACTURING = 1 if an FIE is a manufacturing-oriented enterprise, 0 otherwise;
JOINT-VENTURE = 1 if an FIE is a joint venture, 0 otherwise;
HONGKONG-TAIWAN = 1 if an FIE is sourced from Hong Kong or Taiwan (a proxy for high-inside- ownership concentration), 0 otherwise.

reduce noncompliance, for example, by limiting the length of the pre-holiday period. In addition, tax authorities should consider intensifying audit scrutiny during periods of higher noncompliance, such as in the pre- and post-holiday periods. Our evidence that noncompliance is highest in the pre-holiday period when the tax rate is technically zero, suggests that firms in this circumstance do not only consider the current period's tax rate in their evasion strategy. They have a longer horizon over which they want to minimize taxes.

We also find that domestic market-oriented firms, service-oriented firms, and joint ventures, respectively, are less compliant than export-oriented firms, manufacturing-oriented firms, and wholly foreign-owned enterprises. Such evidence should help policymakers understand factors associated with tax noncompliance, and help tax authorities target firms for audit.

APPENDIX

General Guidelines on Annual Tax Audits in China

Annual tax audits involve the following procedures:

(1) Audit Planning

Before conducting the field work, tax officials obtain a general understanding of the entity's background, including its operations and tax status. They then perform a financial-statement analysis to identify areas that might have misstatements affecting the entity's tax liability. Tax authorities notify an enterprise three days before the audit about the time schedule, location, and documents required for examination.

(2) Field Work

Tax officials should be familiar with the *Income Tax Laws of the People's Republic of China for Enterprises with Foreign Investment and Foreign Enterprises* (NPC 1991), the related implementation regulations, tax treaties, and other tax-concession policies affecting the enterprises audited. In addition, they should examine the tax returns filed, financial statements, and other tax-related documents to ensure proper tax filing. They should follow the detailed procedures provided in the regulation for investigating individual items in financial statements (SAT 1993a). For example, the regulation requires auditors to investigate sales, purchase of materials, fixed assets and depreciation, wages, welfare expenses, land-use rights, entertainment expenses, production costs, accounts receivable and provision for bad debts, and other income. The time spent on each audit depends on the firm's size, the complexity of its operations and the integrity of the company records.

(3) Appeal

When a taxpayer disagrees with the audit adjustments and penalties, the taxpayer must first pay the tax demanded, and then apply for a tax administration review within 60 days (SAT 1993b, Article 31). Taxpayers apply to the tax authorities at the next higher level for reconsideration. For example, tax authorities at provincial level review disagreements at city level. The Tax Administration Review Committee of the higher tax authority should decide on each appeal within 60 days. If the taxpayer objects to the decision, the taxpayer can institute legal proceedings in the People's Court. In practice, few FIEs have requested formal reviews (Huang and Yu 1997).

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BOOK REVIEWS

Jane L. Reimers, Editor

Editor's Note: This issue concludes a series of invited book reviews by leading scholars in accounting. Previous issues have included the reviews of Joel S. Demski, Nicholas Dopuch, William R. Kinney, Jr., and Katherine Schipper. This issue features the reviews of William H. Beaver and Robert Libby. Like the prior reviews, these last two will send you to the library or your own bookshelf to read or reread these classic and influential writings. Professors Beaver and Libby have made numerous outstanding contributions to our profession and have, with these reviews, once again provided interesting and thought-provoking ideas that will influence future accounting thought and research. Special thanks to both of them for these excellent reviews.

JOHN B. CANNING, *Economics of Accountancy: A Critical Analysis of Accounting Theory* (New York, NY: The Ronald Press Company, 1929, pp. 367, $35.95 Hb).

A person is influenced by many factors over the course of a career. I first read Canning's *Economics of Accountancy* as a doctoral student at the University of Chicago in 1964. The book was one of the assigned readings in George Sorter's Accounting Theory Seminar. Other readings included Paton's *Accounting Theory*, Paton and Littleton, Edwards and Bell, Alexander, Moonitz's *Postulates*, and Moonitz and Sprouse's *Principles*.

It is difficult to select just one of these excellent works, and recently Nick Dopuch reviewed Paton and Littleton. However, I have selected Canning's work because it was one of the first attempts to incorporate economic notions in an evaluation of accounting theory. I also perceive it is not as frequently cited as the other references, but I may wrong. Over the years, I have assigned some of these works in my doctoral seminar along with the empirical security price research, but have experienced varying degrees of success in doing so. It is not easy for someone exposed to only the informational approach—which has dominated accounting research for the last 35 years—to appreciate the contribution made by Canning and the earlier scholars.

However, an understanding of this work can be extremely important for at least two reasons. First, to fully appreciate the dramatic impact the informational approach had on accounting research, it is important to understand what accounting theory looked like prior to that time. Second, if one wishes to better understand the conceptual framework of the Financial Accounting Standards Board, a grasp of these early classics is essential. The heritage of the FASB's Concepts Statements is represented in these early efforts. The FASB's discussion of the underlying concepts of what is an asset and what is net income is a variation on the themes developed many decades earlier. The criteria of timeliness, relevance, representational faithfulness, reliability, and verifiability are dimensions that arose from this earlier literature. Accounting data as measurement, rather than information, is also imbedded in these works.

While the FASB statements contain references to accounting numbers as information, current financial reporting is not simply some generic information system based on a compendium of specific disclosure items that are judged to be cost-benefit effective. At the heart of the current reporting system is the reporting of information through the filter of assets, liabilities, revenues, expenses, and net income. The FASB continues to raise the same questions as Canning does. What are assets and are certain claims, such as mortgage-servicing rights, assets? What is a liability and do these claims, such as pensions and OPEB, represent liabilities? What is net income and how should it be measured? Do stock options represent compensation and does a measurement of its "value" represent a deduction from net income? While historical cost under accrual accounting represents the major model used for nonfinancial assets, the controversy over historical costs and fair value continues, and the nature of the trade-offs involved has a familiar ring if one has read Canning and the other early classics.

However, the reader should be forewarned; the form of accounting theory was much different in 1929. Then accounting theory was intuitive and heuristic, rather than formal. It was not empirically based, in the sense of systematically gathering data, hypothesis testing, or statistical analysis. The literature is normative with frequent recommendations as to the best accounting system. However, Canning is less normative than some of the later works by Edwards and Bell, Moonitz and Sprouse, Chambers, and Sterling. Moreover, uncertainty and risk are not dealt with. However, these primitive notions were not well developed in the underlying economic theory from which Canning was drawing.

I have tried to provide a motivation for reading Canning rather than a chapter-by-chapter, verse-by-verse summary of the book. However, I would like to draw your attention to Chapter II (The Nature of Assets); Chapter VIII (The Measurement of Net Income: A Comparison and Contrast of the Accountant's Theory with an Economist's); Chapter X (The Accountant's Problem of Valuation), especially the section, Theory of Value vs. Theory of Valuation; Chapter XI (Direct Valuation), especially the section, Meaning of Market; and the final Chapter XV (Summary and Forecasts).

The final chapter is prophetic in several respects. Here is one example:

> Economists of the past have relied too much upon hypothesis and conjecture about human behavior in enterprise relationships. If they are to test the adequacy of their hypotheses about human nature for supporting not merely the *validity* but the *truth* of their conclusions about human conduct, some resort to the records of behavior about human conduct must be made. Progressive refinement of speculation about the nature of an imaginary race of beings and about the conduct of that race in imaginary market situations is, for some reason, a fascinating exercise, but it is not science. (Canning 1929, 322) (emphasis in the original)

Such a statement foreshadows the introduction of an empirical basis for accounting research, as well as economic research. Today, we would hardly dispute the importance of empirical research to complement theory. We are grateful to Canning for vividly demonstrating the importance of applying economics to major issues in accounting. It is a tradition that is alive and well today. Canning is an essential part of our heritage and is a "must read."

WILLIAM H. BEAVER
Professor

Stanford University

P. SLOVIC AND S. LICHTENSTEIN, "Comparison of Bayesian and Regression Approaches to the Study of Information Processing in Judgment," in *Human Judgment and Social Interaction,* edited by L. Rappoport, and D. A. Summers (New York, NY: Holt, Rinehart & Winston, 1973). [Note: This book is out of print, but the article may be found in *Organizational Behavior and Human Performance*, 6, 1971, pp. 649–744.]

Slovic and Lichtenstein present a review and comparative analysis of research conducted within what were then the two principal approaches in judgment and decision-making research: the Bayesian and regression approaches. One of their major goals was to demonstrate how researchers who were studying a particular substantive problem could increase their understanding by employing a broader class of models and methods. They accomplished much more. By bringing together and integrating hundreds of studies, both theoretical and applied, from these diverse literatures, the authors painted a vivid picture of what we then knew about human decision making. Through a combination of well-developed theory and dramatic practical examples in nonaccounting fields, this monograph paved the way for a generation of researchers interested in judgment and decision making in accounting contexts. To this day, the picture they painted has affected the way I, and many others, think about judgment and decision making in daily life as well as in research.

In looking back at their monograph, I was amazed by how many of the fundamental ideas about the virtues and shortcomings of human decision makers that still drive the literature were articulated in this monograph, and how many other ideas were presaged by their analyses of the deficiencies and gaps in the existing literature. Many of these basic ideas also motivated the development of the vibrant literature on judgment and decision making in accounting. Among these are:

- *Judgment can be modeled.* Much of what we call professional judgment or intuition can be precisely (even quantitatively) described. This idea has had enormous implications for education and training of auditors, analysts, and other accounting professionals.

- *Trade-offs are difficult.* The most difficult part of judgment and decision making involves the act of weighting, trading off, or balancing of conflicting factors.
- *The role of heuristics.* Humans develop simplified decision strategies or heuristics to help deal with environmental complexity. They generally are efficient and effective, but sometimes cause us to ignore or misweight information or knowledge. The circumstances in which they do so are predictable.
- *The importance of task attributes.* Normatively irrelevant factors such as information sequence and display are important determinants of information use.
- *The adaptive decision maker.* Judgment quality is a function of the adaptive interrelationship of the decision maker and the environment.
- *We are not very self-aware.* We often have little insight into our judgment processes or our judgment accuracy. This adds to the difficulty of learning from others and makes the systematic study of judgment and decision making all the more important to us in our role as educators.

They also strongly emphasize the need to integrate the judgment and decision-making literature with mainstream cognitive psychology, which has been a dominant theme in more recent literature.

The authors also provide detailed discussions of the strengths and weaknesses of different modeling methods. More importantly, they explain how specific models and methods direct researchers' attention to some issues and cause them to neglect others. They argue forcefully for the benefits of removing methods-based blinders. Of particular importance to accountants, they demonstrate the relevance of studies of artificial tasks performed by judges unfamiliar with the task as well as studies made in complex but familiar situations by experienced decision makers, and the usefulness of experimental as well as archival analyses. In explaining the need for diversity in models and methods, Slovic and Lichtenstein lament the fact that "of several hundred studies, only a handful indicate any awareness of the existence of comparable research under another paradigm." This phenomenon is also prevalent in some areas of accounting research.

ROBERT LIBBY
Professor

Cornell University

Editorial Data

The following table contains information about turnaround time for manuscripts received (including revisions) in the twelve-month period ended May 31, 2000. Turnaround time is the number of days between the date that the manuscript was received ***and the date of the editor's letter to the author(s).***

	Number of Manuscripts	Cumulative Number	Cumulative Percent
0 ≤ Days ≤ 30	66	66	23.57
31 ≤ Days ≤ 60	116	182	65.00
61 ≤ Days ≤ 90	71	253	90.36
91 ≤ Days ≤ 120	22	275	98.21
121 ≤ Days	5	280	100.00

The mean review time was 51 days; the median review time was 50 days.

EDITORIAL POLICY AND STYLE INFORMATION

EDITORIAL POLICY

According to the policies set by the Publications Committee (which were endorsed by the Executive Committee and were published in the *Accounting Education News*, June 1987), *The Accounting Review* "should be viewed as the premier journal for publishing articles reporting the results of accounting research and explaining and illustrating related research methodology. The scope of acceptable articles should embrace any research methodology and any accounting-related subject, as long as the articles meet the standards established for publication in the journal....No special sections should be necessary. The primary, but not exclusive, audience should be—as it is now—academicians, graduate students, and others interested in accounting research."

The primary criterion for publication in *The Accounting Review* is the significance of the contribution an article makes to the literature.

The efficiency and effectiveness of the editorial review process is critically dependent upon the actions of both authors submitting papers and the reviewers. Authors accept the responsibility of preparing research papers at a level suitable for evaluation by independent reviewers. Such preparation, therefore, should include subjecting the manuscript to critique by colleagues and others and revising it accordingly prior to submission. The review process is not to be used as a means of obtaining feedback at early stages of developing the research.

Reviewers and associate editors are responsible for providing critically constructive and prompt evaluations of submitted research papers based on the significance of their contribution and on the rigor of analysis and presentation. Associate editors also make editorial recommendations to the editor.

MANUSCRIPT PREPARATION AND STYLE

The Accounting Review's manuscript preparation guidelines follow (with a sight modification) the B-format of *The Chicago Manual of Style* (14th ed.; University of Chicago Press). Another helpful guide to usage and style is *The Elements of Style*, by William Strunk, Jr., and E. B. White (Macmillan). Spelling follows *Webster's International Dictionary.*

FORMAT

1. All manuscripts should be typed in 12-point font on one side of $8\frac{1}{2} \times 11''$ good quality paper and be double spaced, except for indented quotations.
2. Manuscripts should be as concise as the subject and research method permit, generally not to exceed 7,000 words.
3. Margins of at least one inch from top, bottom, and sides should facilitate editing and duplication.
4. To promote anonymous review, authors should not identify themselves directly or indirectly in their papers or in experimental test instruments included with the submission. Single authors should not use the editorial "we."
5. A cover page should show the title of the paper, the author's name, title and affiliation, email address, any acknowledgments, and a footnote indicating whether the author would be willing to share the data (see last paragraph in this statement).

Pagination: All pages, including tables, appendices and references, should be serially numbered. Major sections should be numbered in Roman numerals. Subsections should not be numbered.

Numbers: Spell out numbers from one to ten, except when used in tables and lists, and when used with mathematical, statistical, scientific, or technical units and quantities, such as distances, weights and measures. For example: *three days; 3 kilometers; 30 years.* All other numbers are expressed numerically.

Percentages and Decimal Fractions: In nontechnical copy use the word percent in the text.

Hyphens: Use a hyphen to join unit modifiers or to clarify usage. For example: *a well-presented analysis; re-form.* See *Webster's* for correct usage.

Key Words: The abstract is to be followed by four key words that will assist in indexing the paper.

ABSTRACT/INTRODUCTION

An Abstract of about 100 words should be presented on a separate page immediately preceding the text. The Abstract should concisely inform the reader of the manuscript's topic, its methods, and its findings. Key Words and the Data Availability statements should follow the Abstract. The text of the paper should start with a section labeled "I. Introduction," which provides more details about the paper's purpose, motivation, methodology, and findings. Both the Abstract and the introduction should be relatively nontechnical, yet clear enough for an informed reader to understand the manuscript's contribution. The manuscript's title, but neither the author's name nor other identification designations, should appear on the Abstract page.

TABLES AND FIGURES

The author should note the following general requirements:

1. Each table and figure (graphic) should appear on a separate page and should be placed at the end of the text. Each should bear an Arabic number and a complete title indicating the exact contents of the table or figure. Tables and figures should define each variable. The titles and definitions should be sufficiently detailed to enable the reader to interpret the tables and figures without reference to the text.
2. A reference to each graphic should be made in the text.
3. The author should indicate by marginal notation where each graphic should be inserted in the text.
4. Graphics should be reasonably interpreted without reference to the text.
5. Source lines and notes should be included as necessary.

Equations: Equations should be numbered in parentheses flush with the right-hand margin.

DOCUMENTATION

Citations: Work cited should use the "author-date system" keyed to a list of works in the reference list (see below). Authors should make an effort to include the relevant page numbers in the cited works.

1. In the text, works are cited as follows: authors' last name and date, without comma, in parentheses: for example, (Jones 1987); with two authors: (Jones and Freeman 1973); with more than two: (Jones et al. 1985); with more than one source cited together (Jones 1987; Freeman 1986); with two or more works by one author: (Jones 1985, 1987).
2. Unless confusion would result, do not use "p." or "pp." before page numbers: for example, (Jones 1987, 115).
3. When the reference list contains more than one work of an author published in the same year, the suffix a, b, etc. follows the date in the text citation: for example, (Jones 1987a) or (Jones 1987a; Freeman 1985b).
4. If an author's name is mentioned in the text, it need not be repeated in the citation; for example, "Jones (1987, 115) says...."
5. Citations to institutional works should use acronyms or short titles where practicable; for example, (AAA ASOBAT 1966); (AICPA Cohen Commission Report 1977). Where brief, the full title of an institutional work might be shown in a citation: for example, (ICAEW *The Corporate Report* 1975).
6. If the manuscript refers to statutes, legal treatises or court cases, citations acceptable in law reviews should be used.

Reference List: Every manuscript must include a list of references containing only those works cited. Each entry should contain all data necessary for unambiguous identification. With the author-date system, use the following format recommended by *The Chicago Manual*:

1. Arrange citations in alphabetical order according to surname of the first author or the name of the institution responsible for the citation.
2. Use author's initials instead of proper names.
3. Date of publication should be placed immediately after author's name.
4. Titles of journals should not be abbreviated.
5. Multiple works by the same author(s) in the same year are distinguished by letters after the date.
6. Inclusive page numbers are treated as recommended in *Chicago Manual* section 8.67.

Sample entries are as follows:

American Accounting Association, Committee on Concepts and Standards for External Financial Reports. 1977. *Statement on Accounting Theory and Theory Acceptance*. Sarasota, FL: AAA.

Demski, J. S., and D. E. M. Sappington. 1989. Hierarchical structure and responsibility accounting. *Journal of Accounting Research* 27 (Spring): 40–58.

Dye, R., B. Balachandran, and R. Magee. 1989. Contingent fees for audit firms. Working paper, Northwestern University, Evanston, IL.

Fabozzi, F., and I. Pollack, eds. 1987. *The Handbook of Fixed Income Securities*. 2nd edition. Homewood, IL: Dow Jones-Irwin.

Kahneman, D., P. Slovic, and A. Tversky, eds. 1982. *Judgment Under Uncertainty: Heuristics and Biases*. Cambridge, U.K.: Cambridge University Press.

Porcano, T. M. 1984a. Distributive justice and tax policy. *The Accounting Review* 59 (October): 619–636.

———. 1984b. The perceived effects of tax policy on corporate investment intentions. *The Journal of the American Taxation Association* 6 (Fall): 7–19.

Shaw, W. H. 1985. Empirical evidence on the market impact of the safe harbor leasing law. Ph.D. dissertation, The University of Texas at Austin.

Sherman, T. M., ed. 1984. *Conceptual Framework for Financial Accounting*. Cambridge, MA: Harvard Business School.

Footnotes: Footnotes are not used for documentation. Textual footnotes should be used only for extensions and useful excursions of information that if included in the body of the text might disrupt its continuity. Footnotes should be consecutively numbered throughout the manuscript with superscript Arabic numerals. Footnote text should be doubled-spaced and placed at the end of the article.

SUBMISSION OF MANUSCRIPTS

Authors should note the following guidelines for submitting manuscripts:

1. Manuscripts currently under consideration by another journal or publisher should not be submitted. The author must state that the work is not submitted or published elsewhere.
2. In the case of manuscripts reporting on field surveys or experiments, four copies of the instrument (questionnaire, case, interview plan or the like) should be submitted. Information that might identify the author(s) must be deleted from the instrument.
3. Four copies should be submitted together with a check in U.S. funds for $75.00 for members or $100.00 for nonmembers of the AAA made payable to the American Accounting Association. Effective January 1990, the submission fee is nonrefundable.
4. The author should retain a copy of the paper.
5. Revisions must be submitted within 12 months from request, otherwise they will be considered new submissions.

COMMENTS

Comments on articles previously published in *The Accounting Review* will be reviewed (anonymously) by two reviewers in sequence. The first reviewer will be the author of the original article being subjected to critique. If substance permits, a suitably revised comment will be sent to a second reviewer to determine its publishability in *The Accounting Review*. If a comment is accepted for publication, the original author will be invited to reply. All other editorial requirements, as enumerated above, also apply to proposed comments.

POLICY ON REPRODUCTION

An objective of *The Accounting Review* is to promote the wide dissemination of the results of systematic scholarly inquiries into the broad field of accounting.

Permission is hereby granted to reproduce any of the contents of the *Review* for use in courses of instruction, as long as the source and American Accounting Association copyright are indicated in any such reproductions.

Written application must be made to the American Accounting Association, 5717 Bessie Drive, Sarasota, FL 34233-2399, for permission to reproduce any of the contents of the *Review* for use in other than courses of instruction—e.g., inclusion in books of readings or in any other publications intended for general distribution. In consideration for the grant of permission by the *Review* in such instances, the applicant must notify the author(s) in writing of the intended use to be made of each reproduction. Normally, the *Review* will not assess a charge for the waiver of copyright.

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POLICY ON DATA AVAILABILITY

The following policy has been adopted by the Executive Committee in its April 1989 meeting.

"An objective of (*The Accounting Review, Accounting Horizons, Issues in Accounting Education*) is to provide the widest possible dissemination of knowledge based on systematic scholarly inquiries into accounting as a field of professional research, and educational activity. As part of this process, authors are encouraged to make their data available for use by others in extending or replicating results reported in their articles. Authors of articles which report data dependent results should footnote the status of data availability and, when pertinent, this should be accompanied by information on how the data may be obtained."

OCTOBER 2000 PLACEMENT ADS

*The deadline for information to be included in the "Placement Information" section is two months prior to the date of publication. The **Review** is published on the first day of January, April, July and October. Placement advertising and replies should be sent to the American Accounting Association, 5717 Bessie Drive, Sarasota, FL 34233-2399, ATTENTION: ADVERTISING DEPT. All replies to box numbers should be on separate sheets to facilitate forwarding.*

401 UNIVERSITY OF NORTH CAROLINA at Wilmington invites applications for anticipated tenure-track positions at the Assistant/Associate level beginning Fall 2001. Special consideration will be given to candidates with a primary interest in Financial and/or Tax. A Ph.D. in Accounting is required. Candidates must be committed to excellence in teaching and research. Resumes received prior to November 1, 2000 will receive special consideration. Send letter and resume to Dr. Michelle Matherly, Search Committee Chair, Department of Accountancy and Business Law, Cameron School of Business, UNCW, 601 S. College Road, Wilmington, NC 28403-3297. UNCW is an Affirmative Action/Equal Opportunity Employer. Women and minorities are encouraged to apply.

402 OHIO UNIVERSITY'S SCHOOL OF ACCOUNTANCY invites applications for a tenure-track position as Assistant or Associate Professor of Accountancy for the 2001–2002 academic year. All applicants must be academically qualified under AACSB standards and should exhibit a capacity to produce quality research and a commitment to teaching excellence and to professional interaction. Candidates will be expected to teach Income Tax at the undergraduate and graduate levels and one other area of Accounting specialty. Ohio University's College of Business and its School of Accountancy are accredited by the AACSB. Ohio offers two Accounting programs: the B.B.A. and the Master of Science in Accountancy (M.S.Ac.). The University occupies a beautiful residential campus in scenic southeast Ohio. Please submit *curriculum vitae*, transcripts, and three letters of recommendation to Dr. Florence C. Sharp, Search Committee Chair, School of Accountancy, Copeland Hall, Ohio University, Athens, Ohio 45701. Ohio University is an Equal Opportunity Employer. Women, minorities, and individuals with disabilities are encouraged to apply.

403 YORK UNIVERSITY, Schulich School of Business, Toronto, is seeking tenure-stream faculty in Accounting at the Assistant, Associate, or Full Professor level, for July 1, 2001. Preferred candidates will be qualified to teach Financial or Managerial Accounting—expertise teaching International Accounting would be beneficial; possess a completed doctorate or be close to completion; provide evidence of effective teaching; have a commitment to scholarly research and publication; and be willing to use cases in teaching. Please send *curriculum vitae* to Professor Linda Thorne, Accounting Area Coordinator, Schulich School of Business, York University, North York, Ontario, M3J 1P3 CANADA. Salary and benefits are competitive. This position is subject to budgetary approval. York University has a policy of employment equity, including affirmative action for women faculty.

404 SOUTHERN ILLINOIS UNIVERSITY EDWARDSVILLE invites applications for a tenure-track position in Accounting beginning in August 2001. A Ph.D. in Accounting is required, but ABDs nearing completion will be considered. Candidates must be qualified to teach Taxation at both the undergraduate and graduate levels and should be qualified in an additional area of Accounting (e.g., Financial, Managerial). Professional certification and experience are desirable. Candidates must be committed to excellence in teaching and scholarly research. The Department of Accounting offers AACSB-accredited programs at both the undergraduate and master's levels. SIUE is located on a rural campus of 2,700 acres approximately 20 minutes from downtown St. Louis, MO. Send *curriculum vitae* to Michael L. Costigan, Chair, Department of Accounting, Campus Box 1104, Southern Illinois University Edwardsville, Edwardsville, IL 62026-1104. Email: mcostig@siue.edu. SIUE is an Equal Opportunity/Affirmative Action Employer, and applications from women and minorities are especially encouraged.

405 UNIVERSITY OF HOUSTON, Department of Accountancy and Taxation, will interview candidates for tenure-track appointments at any rank for the 2001–2002 academic year. A doctoral degree (or near completion) and a strong commitment to both research and teaching are required. All areas are highly encouraged to apply, but the strongest teaching need is in Information Systems. The department and college are AACSB-accredited. Salaries are competitive. Please send a copy of your resume and a research paper to Recruiting Committee c/o Thomas Noland, College of Business Administration, University of Houston, Houston, TX 77204-6283; Phone: (713) 743-4849; Email: tnoland@uh.edu. The University of Houston is an Equal Opportunity/Affirmative Action Employer. Women, minorities, veterans, and individuals with disabilities are encouraged to apply.

406 LEHIGH UNIVERSITY seeks up to two well-trained scholars who also have a strong commitment to teaching to join its Accounting faculty on tenure tracks in Fall 2001, and begin publishing in major refereed journals. The openings are for an Assistant, Associate, or Full Professor of Accounting. A new Dean with national aspirations, an emerging M.S. in Accounting program, and a dynamic Accounting Department make this a great time to consider Lehigh. Our greatest needs are in Financial Accounting and Reporting, and Auditing and Business Assurance Services with a strong Information Technology focus. If interested, send your *curriculum vitae*, three references, and dissertation proposal or other scholarly work to Dr. Kenneth P. Sinclair, Chair, Department of Accounting, Lehigh University, 621 Taylor Street, Bethlehem, PA 18015-3117; Email: kps1@lehigh.edu. Applications will be accepted until the positions are filled. Qualified women and minority candidates should apply. Lehigh University is an Equal Employment/Affirmative Action Employer.

407 INDIANA UNIVERSITY KOKOMO invites applications for a tenure-track faculty position as Assistant Professor in Accounting, August 2001. Requirements: Doctorate in Accounting; ABD considered if completed by August 2001; CPA or CMA certification; active research agenda; evidence of effective teaching; ability to teach both Financial and Managerial Accounting at graduate and undergraduate levels. Professional experience is desirable. Salary is competitive; benefits are excellent. One of eight Indiana University campuses, Indiana University Kokomo is a comprehensive nonresidential campus located 50 miles north of Indianapolis in Kokomo, Indiana. Additional information can be accessed at http://www.iuk.edu/. Send application letter, resume, and list of three references to Dr. Thomas J. von der Embse, Dean, Business and Economics, Indiana University Kokomo, PO Box 9003, Kokomo, IN 46904-9003; Phone: (765) 455-9275; Email: tvondere@iuk.edu. Application reviews begin October 1, 2000 and continue until the position is filled. IUK is an Equal Opportunity/Affirmative Action/ADA-Compliant Employer.

408 UNIVERSITY OF UTAH, School of Accounting, is recruiting for a new Assistant or Associate tenure-track faculty member, beginning in the 2001–2002 academic year in the area of Information Systems. Applicants should possess a doctorate or be close to completion. Rank will be considered subject to qualifications. Salaries, research support, and teaching loads are competitive; fringe benefits are excellent. The School of Accounting and the David Eccles School of Business are both accredited at the undergraduate and graduate levels by the AACSB. Bachelor's, M.B.A., Master of Accounting, and Ph.D. programs are offered. The application deadline is February 1, 2001, or until the position is filled. Please send application including dissertation proposal or working paper, *curriculum vitae*, and three letters of reference to Martha M. Eining, Director, School of Accounting, 1645 E Campus Center Dr., Rm. 101, University of Utah, Salt Lake City, Utah 84112. The University of Utah is an EO/AA Employer and encourages applications from women and minorities, and provides reasonable accommodations to the known disabilities of employees.

409 UNIVERSITY OF LOUISVILLE invites applications for the position of Assistant Professor of Accountancy that will be available for Fall 2001. Minimum qualifications are Ph.D. or D.B.A. in Accounting, strong commitment to student learning, and quality research capabilities. ABDs will be considered only if substantial progress has been made on the dissertation. Preferred area of teaching and research is Auditing/Assurance Services with any secondary interest. Preference will be given for professional experience and/or established teaching and publication record. Position will remain open until filled. The Accountancy Program is accredited by the AACSB. Please send a current *curriculum vitae* to Dr. Julia N. Karcher, Director, School of Accountancy, College of Business and Public Administration, University of Louisville, Louisville, Kentucky 40292. AA/EEO.

410 OREGON STATE UNIVERSITY invites applicants for two anticipated tenure-track positions in Accounting to begin September 2001. All ranks and teaching areas will be considered although our primary needs are in Financial, Auditing, and Information Systems. Responsibilities include quality teaching, research, and professional activities in the field of Accounting. Candidates should hold the appropriate doctorate. Professional certification is desirable. Salary is competitive; fringe benefits are excellent. Interested applicants should submit a letter of interest, current *curriculum vitae*, recent teaching evaluations, evidence of scholarly work, and the names and addresses of three references to Dr. Roger Graham, College of Business, 200 Bexell Hall, Oregon State University, Corvallis, OR 97331-2603. For full consideration apply by October 31, 2000. Applications will be accepted until the positions are filled. OSU is an AA/EEO Employer.

411 LOUISIANA STATE UNIVERSITY, Department of Accounting in the E. J. Ourso College of Business Administration, invites applications for one or more anticipated tenure-track Assistant/Associate/Full Professor openings to begin August 2001. Applications at the Assistant and Associate rank will be considered in all disciplines. Applications at the Associate or Full rank will be considered with a specialty in Financial Accounting. The Assistant rank positions require that the doctoral degree in Accounting be completed, or near completion, by the date of appointment. If degree is not completed by date of appointment, rank will be at Instructor level. C.P.A. is preferred. Faculty are expected to teach undergraduate and graduate courses, be actively involved in academic research, and provide service to the profession and the university. Applications will be accepted until November 1 and will continue until candidates are selected. Please send a letter of application, *curriculum vitae*, and references to Don W. Finn, Chair, Department of Accounting, 3101 CEBA Building, Louisiana State University, Ref: Log #1357, Baton Rouge, LA 70803. LSU is an Equal Opportunity/Equal Access Employer.

412 UNIVERSITY OF HAWAII AT MANOA is accepting applications for two full-time teaching and research Assistant Professor positions in the School of Accountancy: Position Number 83434 is in the area of Information Systems, and Position Number 82443 is in the area of Auditing. Tenure track is to begin Spring or Fall 2001. Minimum qualifications include Ph.D., D.B.A., or ABD in Accounting; demonstrated ability to carry out and publish research; demonstrated ability in teaching at the university level. Desirable qualifications include CPA, CMA, and professional accounting experience. Salary is negotiable based on experience and qualifications. Submit a hard copy of application (notate position number), three references, and resume to Dr. John Wendell, Chair of Recruiting Committee, School of Accountancy, University of Hawaii, 2404 Maile Way, Honolulu, Hawaii 96822. Recruitment will continue until positions are filled; first screening date is October 1, 2000. University of Hawaii at Manoa is an Equal Opportunity Employer/Affirmative Action institution.

413 SEATTLE UNIVERSITY invites applications and nominations for a full-time, tenure-track Accounting position at the Assistant or Associate rank starting Fall Quarter 2001. Applicants for the position should possess a Ph.D. or have an anticipated completion date of August 2001. The candidate is expected to have an established record as an effective teacher and a demonstrated capacity to conduct publishable research; the candidate also should have a teaching interest in Financial and Managerial Accounting. Additional experience or interest in teaching Information Systems is highly desirable. Send inquires and resumes by December 1, 2000 to David E. Tinius, Chair, Department of Accounting, Albers School of Business & Economics, Seattle University, 900 Broadway, Seattle, WA 98122; Phone: (206) 296-5692; Email: dtinius@seattleu.edu. Two years of one-ninth salary summer grants and three years of teaching release time support are guaranteed. See additional position information at http://www.seattleu.edu. Seattle University, a Jesuit, urban university, is committed to the centrality of teaching, learning, and education of the whole person. EEO/AAE.

414 UNIVERSITY OF NEW ORLEANS invites applications for an anticipated Assistant Professor position for Fall 2001. Preference will be given to those with a teaching and research interest in either Cost/Managerial or Accounting Information Systems, with a secondary interest in Financial Accounting or Auditing. Candidates must have the Ph.D. with an Accounting major (or ABD with completion of the Ph.D. by the end of 2001). Salary is negotiable and competitive. The Department offers the undergraduate Accounting degree (over 500 majors) and two master's degrees (including a Tax Option). The Department has separate AACSB accounting accreditation at both the graduate and undergraduate levels. Candidates should send a resume to Professor Philip J. Harmelink, Chairman, Department of Accounting, College of Business Administration, University of New Orleans, New Orleans, LA 70148. The University of New Orleans is a member of the Louisiana State University System and an Affirmative Action/Equal Opportunity Employer.

415 ANGELO STATE UNIVERSITY invites applications for a tenure-track position at the Assistant, Associate, or Full Professor level beginning in Fall 2001. The salary is competitive and summer school or a research grant is usually available at one-sixth of the nine-month salary. Applicants must hold a doctorate in Accounting. The 12-hour-per-semester load will include Cost and Managerial Accounting and a graduate course in Financial Statement Analysis. Applications should consist of a (1) a cover letter, (2) current resume, (3) photocopies of undergraduate and graduate transcripts, (4) three letters of reference evaluating the applicant's teaching of accounting, and (5) the ASU Application for Faculty Employment, which is available at http://www.angelo.edu/forms/pdf. Contact Dr. Norman A. Sunderman, Head, Department of Accounting, Economics, and Finance, Angelo State University, San Angelo, TX 76909. Review of applications will begin October 27, 2000 and continue until the position is filled. Angelo State University is an Equal Opportunity/Affirmative Action Employer.

416 STATE UNIVERSITY OF NEW YORK (SUNY) AT BINGHAMTON, AACSB-accredited School of Management, invites applications for Assistant Professor of Accounting (Fall 2001) to serve in Bachelor's, Master's, E.M.B.A., and Ph.D. programs. Primary areas are Behavioral, Financial, and Managerial. SUNY at Binghamton has been designated a "Public Ivy," rated 22nd (1999, *U.S. News & World Report*) among publics and has well-established CPA connections (i.e., 70/140 Accounting seniors had "Big 5" offers prior to September) and a substantial regional high-tech (IBM, Lockheed Martin, Universal Instruments, and BAE Aerospace) community. Three hours from New York City and one hour from Syracuse and Ithaca, SUNY at Binghamton is a low cost-of-living regional medical/retail hub for 300,000 people. Quality research is supported with a two-course/semester teaching assignment. Both are highly valued. Interested candidates should send a *curriculum vitae* to Glenn A. Pitman, Dean, School of Management, SUNY at Binghamton, Binghamton, NY 13902-6015; Email: lnewton@binghamton.edu; Fax: (607) 777-4872. SUNY at Binghamton is an Equal Opportunity/Affirmative Action Employer.

417 STATE UNIVERSITY OF NEW YORK (SUNY) AT BINGHAMTON, AACSB-accredited School of Management, seeks to fill one senior-level position (Full/Associate) in Accounting, either as a largely academic position or as Director of the School of Accountancy. Either appointment will require interaction with the practice community and service in our Ph.D. program. SUNY at Binghamton has been designated a "Public Ivy," rated 22nd (1999, *U.S. News & World Report*) among publics and has well-established CPA connections (i.e., 70/140 Accounting seniors had "Big 5" offers prior to September) and a substantial regional high-tech (IBM, Lockheed Martin, Universal Instruments) community. Three hours from New York City and one hour from Syracuse and Ithaca, SUNY at Binghamton is a low cost-of-living regional medical/retail hub for 300,000 people. Quality research is supported with a two-course/semester teaching assignment. Interested candidates should send a *curriculum vitae* to Glenn A. Pitman, Dean, School of Management, SUNY at Binghamton, Binghamton, NY 13902-6015; Email: gpitman@binghamton.edu; Fax: (607) 777-4872. SUNY at Binghamton is an Equal Opportunity/Affirmative Action Employer.

418 UNIVERSITY OF NEBRASKA–LINCOLN, School of Accountancy, invites applications for the Deloitte & Touche Professorship of Accountancy at the Associate or Full Professor rank. The candidate will provide leadership in research, and teaching (preferably Financial Accounting or Auditing) at the undergraduate and graduate levels. Applicants with a Ph.D. or D.B.A. in Accounting, a demonstrated record of research and teaching, and a promise of significant future contributions are encouraged to apply. The CPA or CMA designation is desirable. The appointment will begin Fall 2001. Salary is competitive and commensurate with qualifications. Inquiries, nominations, and applications (including resume and three references) should be directed to Professor Thomas E. Balke, 307 CBA, University of Nebraska–Lincoln, Lincoln, NE 68588-0488; Phone: (402) 472-2337; Fax: (402) 472-4100; Email: tbalke@unl.edu. The University of Nebraska is committed to a pluralistic campus community through Affirmative Action and Equal Opportunity and is responsive to the needs of dual-career couples. We assure reasonable accommodation under the Americans with Disabilities Act.

419 UNIVERSITY OF NEBRASKA–LINCOLN, School of Accountancy, invites applications for Assistant Professor of Accounting. Responsibilities include teaching at the undergraduate and graduate (M.B.A., M.P.A., Ph.D.) levels in Financial Accounting or Auditing, conducting a program of research and scholarly activity leading to publication in referred journals, and participating in professional and university service activities. Applicants should have a Ph.D. or D.B.A. in Accounting or be near completion of a degree. The CPA or CMA designation is desirable. The appointment will begin Fall 2001. Salary is competitive. Applications (including resume and three references) should be directed to Professor Thomas E. Balke, 307 CBA, University of Nebraska–Lincoln, Lincoln, NE 68588-0488; Phone: (402) 472-2337; Fax: (402) 472-4100; Email: tbalke@unl.edu. Information about the College and School is available at our web site: http://www.cba.unl.edu. The University of Nebraska is committed to a pluralistic campus community through Affirmative Action and Equal Opportunity and is responsive to the needs of dual-career couples. We assure reasonable accommodation under the Americans with Disabilities Act.

420 PROVIDENCE COLLEGE invites applications for a tenure-track Assistant Professorship, commencing Fall 2001. All specialty areas considered, especially Cost/Management Accounting. Candidates must demonstrate commitment to teaching and evidence of effective teaching, scholarly, and professional activities, and support of the mission of Providence College. Doctorate required; applicants nearing completion of dissertation will be considered. Relevant professional experience preferred. Submit a statement of interest; current *curriculum vitae*; and names, addresses, and phone numbers of three references to Judith Morse, Chair, Department of Accountancy, Providence College, Providence, RI 02918. The search will continue until position is filled. Providence College is a Roman Catholic four-year liberal arts college conducted under the auspices of the Dominican Friars; it offers a Bachelor of Science degree in Accountancy and a Master of Business Administration degree. An EEO/Affirmative Action Employer, Providence College especially encourages the application of women and minorities.

421 UNIVERSITY OF WISCONSIN–MILWAUKEE is seeking applications for a tenure-track Assistant or Associate Professor in Accounting beginning Fall 2001. Teaching responsibilities will include basic and advanced courses in Accounting at the undergraduate and master's level with an emphasis on Accounting Information Systems. Candidates must hold a Ph.D. in Business Administration, with a major in Accounting, and have strong research and teaching capabilities. Preference given to candidates with an established record of research and quality teaching. CPA certification and professional accounting experience highly desirable. The School of Business Administration offers B.B.A., M.B.A., Executive M.B.A., M.S. (including specialization in Accounting), and Ph.D. degree programs. For additional information about the School please see our web site at http://www.uwm.edu/Dept/Business/SBA. Applicants should send a letter of application and *curriculum vitae* postmarked by November 30, 2000 to Professor Leslie Kren, School of Business Administration, UW–Milwaukee, Milwaukee, WI 53201-0742; Email: lkren@uwm.edu; Phone: (414) 229-6075; Fax: (414) 229-6957. UWM is an AA/EO Employer.

422 UNIVERSITY OF WISCONSIN–MILWAUKEE is seeking applications for a tenure-track Assistant Professor in Taxation beginning Fall 2001. Teaching responsibilities will include graduate and undergraduate courses in Taxation and may also include Accounting Principles at the undergraduate level. Candidates must hold a Ph.D. in Business Administration, with a major in Accounting, and have strong research and teaching capabilities. CPA certification and professional tax experience are also highly desirable. The School of Business Administration offers B.B.A., M.B.A., Executive M.B.A., M.S. (including specialization in Taxation), and Ph.D. programs. The Deloitte & Touche Center for Multistate Taxation was established at the School in 1996. For additional information about the School please see our web site at http://www.uwm.edu/Dept/Business/SBA. Applicants should send a letter of application and *curriculum vitae* postmarked by November 30, 2000 to Professor Leslie Kren, School of Business Administration, University of Wisconsin–Milwaukee, WI 53201-0742; Email: lkren@uwm.edu; Phone: (414) 229-6075; Fax: (414) 229-6957. UWM is an AA/EO Employer.

423 SAN JOSE STATE UNIVERSITY invites applications for Fall 2001 for three tenure-track Accounting positions as Associate or Assistant Professor or temporary appointment as Visiting Professor as Lecturer with an emphasis in: (1) Taxation, (2) Accounting Information Systems, (3) Management Accounting. The candidate must have demonstrated versatility in subject matter competencies and pedagogy. The teaching assignment is at both graduate and undergraduate levels including traditional and accelerated formats. The positions are subject to final approval by the University. The minimum credential requirement is Ph.D. for tenure-track appointments, and an M.B.A. for temporary appointments. Strong preference will be given to candidates who hold a Ph.D. from an AACSB-accredited university. The application deadline is December 31, 2000 or until the position is filled. Send application letter, resume, and three letters of reference to Dr. Joseph Mori, College of Business, San Jose State University, One Washington Square, BT850, San Jose, CA 95192-0066; Telephone: (408) 924-3460; Email: mori_j@cob.sjsu.edu. Interviews may be scheduled with Dr. Joe Mori. San Jose State University is an Equal Opportunity/Affirmative Action Employer.

424 NORTHERN KENTUCKY UNIVERSITY invites applications for the position of Assistant Professor in the area of Financial Accounting, effective Fall 2001. Applicants must have a Ph.D. degree or be a Ph.D. candidate from an AACSB-accredited school. Professional certification and relevant work experience preferred. The Department of Accountancy offers both undergraduate and graduate degree programs in Accounting. The College of Business is accredited by AACSB and serves approximately 2,000 undergraduate majors and 200 graduate students. Northern Kentucky University is a metropolitan institution located in the greater Cincinnati area. Candidates should send a letter of application and a current resume to Dr. Linda M. Marquis, Chairman, Department of Accountancy, College of Business, Northern Kentucky University, Highland Heights, KY 41099. Review of applications will begin December 1, 2000, but applications accepted until position is filled. Northern Kentucky University is an AA/EEO Employer and actively seeks the candidacy of minorities and women.

425 MICHIGAN STATE UNIVERSITY, Eli Broad College of Business, seeks to hire one or two tenure-track faculty members for the August 2001 academic year. We are open to all ranks. Information Systems is based in the Accounting Department at MSU. An interdisciplinary institute combining expertise in IT across business, engineering, and communication disciplines exists. Teaching responsibilities involve a flexible range of graduate and undergraduate courses. A doctoral degree either in Information Systems or in Accounting with strong IS training is required. On-campus interviews start in October 2000. Candidates are asked to submit a *curriculum vitae* and a working paper before October 1, 2000 or until position is filled to Professor Severin Grabski, N270 Business College Complex, Eli Broad College of Business, Michigan State University, East Lansing, MI 48824-1121; Email: grabski@msu.edu. Michigan State University is an Affirmative Action/Equal Opportunity Institution. Handicappers have the right to request and receive reasonable accommodations.

426 WESTERN WASHINGTON UNIVERSITY invites applications for a tenure-track, Assistant Professor position in Financial Accounting beginning Fall 2001. Candidates must have a Ph.D. or D.B.A. ABD candidates will be considered only if completion of the dissertation is imminent. Some preference will be given to candidates with experience in teaching Accounting Theory with a writing component, Advanced Accounting, and Auditing. Professional certification preferred. Duties include teaching undergraduate and M.B.A. courses, university service, and scholarly research and publication. Western is a university of 12,000 students located on Puget Sound between Seattle and Vancouver, B.C. Both the baccalaureate and M.B.A. programs are AACSB-accredited. Please send letter of application, *curriculum vitae*, transcripts, evidence of teaching effectiveness, and names of three references (via the U.S. mail) to Dr. Marguerite R. Hutton, Chair, Department of Accounting, CBE, Western Washington University, Bellingham, WA 98225-9071; Phone: (360) 650-3202; Email: Zite.Hutton@wwu.edu. To request disability accommodation, call (360) 650-3306 (V); (360) 650-7606 (TTY). AA/EOE.

427 WAKE FOREST UNIVERSITY, the Calloway School of Business and Accountancy, invites applications for a faculty position in Accounting at the Assistant or Associate rank beginning Fall Semester 2001. Applicants should have doctoral degree (or ABD near completion). Accounting and Auditing experience is preferred. The primary teaching responsibility associated with this position will be in Auditing. Wake Forest University is a small, highly selective, private university characterized by its devotion to excellence in the liberal arts and by its strong graduate and professional programs. The Calloway School offers a B.S./M.S. in Accounting and bachelor's degrees in other business disciplines. The School's Accounting and Business programs are AACSB-accredited. Candidates should send resumes to S. Douglas Beets, Chair of Search Committee, The Calloway School of Business and Accountancy, Wake Forest University, 7285 Reynolda Station, Winston-Salem, NC 27109. Review of applications will begin immediately. EOE/AA.

428 UNIVERSITY OF LETHBRIDGE, Faculty of Management, in Lethbridge, Alberta, Canada, is seeking to fill one or more tenure-track positions in Accounting starting in July 2001 (the level of the position is open). The position requires a Ph.D. in Accounting (ABD considered). Applicants must have a commitment to effective and innovative teaching and have demonstrated an ability to conduct scholarly research. The Faculty seeks candidates who are able to teach Financial Accounting and/or Auditing, and who are attracted to a position that provides a balance between research and teaching. Applicants should send a letter of application and a current resume to Dr. Toni Nelson, Associate Dean, Faculty of Management, University of Lethbridge, 4401 University Drive, Lethbridge, Alberta, T1K 3M4 CANADA; Email: nelson@uleth.ca. The University of Lethbridge is an Equal Opportunity Employer.

429 UNIVERSITY OF UTAH, School of Accounting, is recruiting for an Assistant or Associate tenure-track faculty member, beginning in the 2001–2002 academic year. Applicants should possess a doctorate or be close to completion. Rank will be considered subject to qualifications. Salaries, research support, and teaching loads are competitive and fringe benefits are excellent. The School of Accounting and the David Eccles School of Business are both accredited at the undergraduate and graduate levels by the AACSB. Bachelor's, M.B.A., Master of Accounting, and Ph.D. programs are offered. The application deadline is February 1, 2001, or until the position is filled. Please send application including dissertation proposal or working paper, *curriculum vitae*, and three letters of reference to Martha M. Eining, Director, School of Accounting, 1645 E. Campus Center Drive, Room 101, University of Utah, Salt Lake City, Utah 84112. The University of Utah is an EO/AA Employer and encourages applications from women and minorities and provides reasonable accommodations to the known disabilities of employees.

430 PENNSYLVANIA STATE UNIVERSITY AT ERIE, The Behrend College, School of Business, is seeking applications for a tenure-track Managerial Accounting position at the Assistant Professor level (Ph.D. or D.B.A.; ABDs considered at instructor level) starting August 2001. Record of relevant industry experience desirable. High-quality teaching and active program of scholarship expected. Teaching responsibilities: 15 credits for the academic year including a combination of undergraduate courses in Introductory Accounting, Cost Accounting, and Advanced Managerial Accounting, and a graduate (M.B.A.) Managerial Accounting course. Research support: microcomputers for individual faculty members, full access to major statistical packages and databases, and funded travel to professional meetings. Summer research support: negotiable. Salary: negotiable and competitive with AACSB-accredited schools of business. Application deadline is October 31, 2000, or until suitable applicant identified. Letter of application, three letters of recommendation, copies of student evaluations, and research writing sample should be addressed to Dr. Magenau, School of Business, Pennsylvania State University at Erie, Box AR7, Station Road, Erie PA 16563. AAEOE.

431 SAN DIEGO STATE UNIVERSITY (SDSU), School of Accountancy, invites applications for the position of Assistant Professor emphasizing Managerial Accounting and/or Accounting Information Systems. Applicants should have completed, by August 2001, a Ph.D. or D.B.A. in Accounting with a primary emphasis in Managerial Accounting and/or AIS. A record of teaching excellence and quality scholarship is strongly desired. Teaching experience, business experience, and professional certification (e.g., CPA, CMA, CIA) are desirable. SDSU values both quality teaching and scholarship. The program is highly integrated and nontraditional, with 18 faculty members. The position is available August 2001, subject to final budget. If interested, send or email a letter stating an interest, a current *curriculum vitae*, three letters of recommendation, and examples of teaching and scholarship to Andrew H. Barnett, Director, School of Accountancy, San Diego State University, San Diego, CA 92182-8221; Email: andrew.barnett@sdsu.edu. See http://soa.sdsu.edu for position details. SDSU is an Equal Opportunity Employer.

432 ROCHESTER INSTITUTE OF TECHNOLOGY, College of Business, invites applications for a tenure-track Accounting faculty member at the Assistant or Associate/Full rank. Candidates at the Associate/Full rank must have a well-established publication record as well as evidence of solid teaching. All areas of professional interest are welcome. RIT is a private university with 15,000 students. The College of Business is AACSB-accredited with 800 undergraduate and 500 graduate students. Applications will be accepted until the position is filled. Address applications and inquires to Faculty Searches, Steven Gold, Department Chair, College of Business, RIT, Rochester, NY 14623. RIT is an EEO Employer and encourages applications from minorities and women.

433 NATIONAL DONG-HWA UNIVERSITY, Department of Accounting, invites applications for two positions in Accounting effective August 1, 2001. The rank is open. Applicants should possess a Ph.D. in Accounting or expect completion of Ph.D. program by the end of the 2000–2001 academic year. They should also specialize in at least one of the following two fields: Financial Accounting or Management Accounting; and one of the following two fields: Auditing or Tax Law and Accounting. The positions will remain open until filled. Please send letter of application, resume, three letters of recommendation, examples of recent scholarly work, and a copy of transcript for Ph.D. program to Dr. Young Hang Chang, Department of Accounting, National Dong-Hwa University, Hualien, Taiwan. Telephone: +866-3-8662500, Ext. 1771 or 1772; Fax: +866-3-8663367.

434 OTTERBEIN COLLEGE is conducting a search for a tenure-track, Associate/Assistant Professor, Fall 2001. Ph.D. required. ABD candidates will be considered if completion of dissertation is imminent. A commitment to excellent teaching and solid scholarship is essential. Priority will be given to individuals with prior teaching experience, including Managerial Accounting at the M.B.A. level, and an ability to teach in a number of Accounting areas. Candidate will teach seven courses per academic year (quarter system) in undergraduate and M.B.A Accounting. Send application letter, resume, and three (3) current letters of recommendation to Dr. Patricia A. Frick, VP Academic Affairs, Otterbein College, Westerville, OH 43081. Deadline: December 15, 2000; Web page: http://www.otterbein.edu. Women and Minorities are encouraged to apply. Otterbein College is an Equal Opportunity/Affirmative Action Employer.

435 UNIVERSITY OF ARIZONA. Department of Accounting, invites applications for Assistant, Associate, Full Professors, full- and part-time adjunct lecturers of Accounting. Visiting positions may also be available at all ranks for academic year 2001–2002. Applicants for Assistant rank should possess a Ph.D. or be nearing completion. Advanced-rank applicants must possess an earned doctorate and an established record of recent and continuing research and quality teaching. All tenure-track applicants must be committed to a continuing research program. Visitors/lecturers with a Ph.D., pertinent experience, and a CPA certificate will be given preference. For further qualifications and information, see http://www.hr.arizona.edu. Review of applications will begin November 1, 2000. This announcement will remain open until the positions are filled. To apply, submit cover letter, resume, and names and contact information for three references to Professor Dan S. Dhaliwal, Head, Department of Accounting, McClelland Hall 301, PO Box 210108, University of Arizona, Tucson, AZ 85721-0108. The University of Arizona is an EEO/AA Employer M/W/D/V.

436 CALIFORNIA STATE UNIVERSITY, SACRAMENTO invites applicants for an Assistant Professor position in Accounting Information Systems. Ph.D. (or ABD) from an AACSB-accredited program is required. Record of research, practical experience in AIS, and academic preparation or experience in Accounting is desired. Emphasis on teaching, but research and service are required. Position requires working with a diverse student population. Selected applicant will be expected to design and teach Cable TV and Web-based courses in AIS. Faculty development and training opportunities are available. Salary is competitive and commensurate with academic preparation, record of research, and professional experience. Summer research grants, etc., may be available. Send *curriculum vitae* to Roger Bartlett, Chair, Department of Accountancy, C.S.U. Sacramento, CA 95819-6088 or Email: rbar@csus.edu. Review begins on August 31, 2000. Position is open until filled. CSUS is an AA/EEO employer hiring only individuals lawfully authorized to accept employment in the United States.

437 UNIVERSITY OF SOUTHERN CALIFORNIA, Leventhal School of Accounting, an academic unit within the Marshall School of Business, seeks a Dean. The Leventhal School offers undergraduate and graduate programs in Accounting that are routinely ranked among the top ten programs in Accounting. The next Dean of the Leventhal School will have a unique opportunity to shape the future of the Leventhal School within the context of a Business School and University that are among the best in the nation. Candidates for the position of Dean should be established scholars in Accounting or Accounting professionals with a significant record of management and an understanding of the unique environment of a major research university. The successful candidate will be able to lead a strong research agenda, facilitate outstanding teaching, develop cooperative relationships with other components of the Marshall School, and cooperate in development efforts with the Marshall School and University of Southern California. Nominations and applications should be directed to Chair, Dean Search Committee, Leventhal School of Accounting, Marshall School of Business, University of Southern California, Los Angeles, CA 90089-1426. University of Southern California is an Equal Opportunity Employer.

438 UNIVERSITY OF NEVADA, LAS VEGAS, College of Business, is accepting applications for two full-time tenure-track, Assistant Professor positions for Fall 2001 specializing in Information Systems or Financial Accounting. Qualifications are Ph.D. in Accounting, strong academic record, and potential for excellence in teaching and research. ABDs will be considered. The M.S. in Accountancy and baccalaureate degrees are accredited by the AACSB. Send a letter of application, *curriculum vitae*, and three letters of recommendation to Dr. Tom McCaslin, Chair, Department of Accounting, College of Business, University of Nevada, Las Vegas, Las Vegas, NV 89154-6003. Email: mccaslin@ccmail.nevada.edu; Phone: (702) 895-1559. For more information, see the UNLV World Wide Web Site at: http://www.unlv.edu. Review of applications begins immediately and continues until the positions are filled. The positions are contingent upon funding. UNLV is an Equal Opportunity/Affirmative Action Employer. Persons are selected on the basis of ability without regard to race, color, sex, age, national origin, sexual orientation, religion, disability, or veteran status.

439 NORTH CAROLINA STATE UNIVERSITY is seeking applicants for tenure-track faculty positions starting Fall 2001. Applicants must have a Ph.D. in Accounting or anticipate completion of a Ph.D. in Accounting or Information Systems by Fall 2001. Preference will be given to those applicants with teaching and research interests in Accounting Information Systems, Information Technology, Auditing, or Managerial Accounting. Please send letters of application, *curriculum vitae*, and names/addresses of three references to Professor Kathy Krawczyk, Recruiting Coordinator, Box 8113, Department of Accounting, North Carolina State University, Raleigh, NC 27695-8113; Email: katherine_krawczyk@ncsu.edu. North Carolina State University is an Affirmative Action/Equal Opportunity Employer.

440 UNIVERSITY OF OREGON, Department of Accounting, invites applications for an Assistant/Associate Professor position in Accounting effective September 16, 2001. Responsibilities include teaching Accounting courses at the undergraduate and graduate levels as well as supervising Ph.D. students. In addition, faculty are expected to produce research publishable in top-level journals. To apply for the Assistant rank, the candidate should have completed or nearly completed a Ph.D. degree. For the Associate rank, a completed Ph.D. degree, a record of scholarly accomplishment, and demonstrated teaching competence is expected. Salary levels are competitive and research support is excellent. The review of applications will begin January 31, 2000 and continue until a suitable candidate is identified. Candidates should contact Dale Morse, Charles H. Lundquist College of Business, 1208 University of Oregon, Eugene, OR 97403-1208; Email: dmorse@lcbmail.uoregon.edu. The University of Oregon is AA/EO/ADA institution committed to cultural diversity.

441 MICHIGAN STATE UNIVERSITY, The Eli Broad Graduate School of Management, invites applicants for the position of Professor and Chair of the Department of Accounting effective July 1, 2001, subject to the Provost's approval. Earned doctorate is required; professional certification preferred. A strong research and publication record is also desirable. The successful candidate will provide leadership for both our nationally recognized undergraduate and graduate programs in Accounting. Review of applications begins October 1st and will continue until the position is filled. Send letter, resume, and the names, addresses, and phone numbers of three references to Department Chair Search Committee, Department of Accounting, N270 North Business Complex, The Eli Broad Graduate School of Management, Michigan State University, East Lansing, MI 48823. Michigan State University is an Affirmative Action/Equal Opportunity Employer.

442 JAMES MADISON UNIVERSITY anticipates recruiting an Assistant Professor (tenure-track) for the 2001–2002 academic year. Applicants are expected to hold doctorate in Accounting from an AACSB-accredited institution or be close to completion, be a CPA, and have relevant practical experience. Primary teaching duties include undergraduate and graduate Auditing. The successful candidate must demonstrate proficiency and dedication to use of technology in the classroom. Teaching excellence and commitment to quality research and service are expected. James Madison University is a selective, state-supported institution located in the historic, scenic Shenandoah Valley. All Accounting and Business Programs are AACSB-accredited. Send *curriculum vitae* to Dr. David Fordham, School of Accounting, James Madison University, MSC 0203, Harrisonburg, VA 22807. James Madison University is an Equal Opportunity/Affirmative Action/Equal Access Employer and especially encourages applications from minorities, women, and persons with disabilities.

443 WASHINGTON UNIVERSITY, John M. Olin School of Business, is seeking faculty in Accounting at all levels starting Fall 2001. The qualifications include a demonstrated interest in and capacity to do research publishable in leading Accounting journals and a high level of teaching competence in graduate and undergraduate classes. Candidates should hold a doctorate degree or be very near completion. Salary and faculty support are highly competitive. Each application should include a *curriculum vitae* and a copy of the dissertation proposal (or the completed dissertation); more established scholars should include several samples of their scholarship. Send all materials to Dean Stuart I. Greenbaum, John M. Olin School of Business, Washington University, Campus Box 1133, One Brookings Drive, St. Louis, MO 63130-4899. Washington University is an Equal Opportunity/Affirmative Action Employer and welcomes applications from women and minorities.

444 UNIVERSITY OF NEW HAMPSHIRE, Whittemore School of Business and Economics, invites applications for a tenure-track position in Accounting at the Assistant or the Associate Professor level beginning Fall 2001. Applicants at the Assistant level must have a doctoral degree or be near completion. Applicants at the Associate level must have a proven track record. Interested applicants should submit a letter of interest, current *curriculum vitae*, recommendation letters, recent teaching evaluations, and evidence of scholarly work to Professor John Freear, Whittemore School of Business and Economics, Box A, McConnell Hall, University of New Hampshire, Durham, NH 03824; Telephone: (603) 862-3376; Email: jfreear@hopper.unh.edu. The School is accredited by the AACBS. Application review to begin immediately and continue until the position is filled. UNH is committed to excellence through diversity among its faculty and strongly encourages women and minorities to apply.

445 WASHINGTON STATE UNIVERSITY invites applications for an Assistant Professor, Cost/Managerial Accounting, starting August 16, 2001. Requires doctorate or ABD in Accounting, a record of published research or research potential, and effective teaching. A research interest in Managerial Accounting is desirable. Experience teaching Cost/Managerial Accounting is highly desirable. Six-hour teaching load, summer research support, competitive salary, and excellent fringe benefits. Review of applications begins October 15, 2000 and continues until the position is filled. Send letter of application, resume, student teaching evaluations (or summary), recent research paper, and three letters of recommendation to Accounting Search Chair, School of Accounting, Information Systems, and Business Law, Box 644729, Washington State University, Pullman, WA 99164-4729. WSU is an EO/AA Educator and Employer. Protected groups are encouraged to apply.

446 STATE UNIVERSITY OF NEW YORK COLLEGE AT GENESEO, Jones School of Business, seeks to fill a tenure-track position at the Assistant/Associate rank in Accounting for September 2001 with a dedicated educator and scholar. A demonstrated commitment to excellent teaching is essential. Faculty are also expected to engage in scholarly activity. Candidates must hold a Ph.D. in Accounting or be near completion. Teaching responsibility is in two or more of the following areas: Auditing, Systems Design, Tax, or Managerial. Letters of application, *curriculum vitae*, and three recent letters of recommendation should be sent to Mary Ellen Zuckerman, Head Jones School of Business, South Hall 113, State University of New York College at Geneseo, 1 College Circle, Geneseo, NY 14454. Review of applications will begin September 1, 2000. The State University of New York College at Geneseo is an Equal Opportunity/Affirmative Action Employer.

447 UNIVERSITY OF TULSA, School of Accounting, invites applications for a September 2001 tenure-track position at the Assistant or Associate Professor level. Candidates with interests in Tax and Financial Reporting will be given special consideration. Minimum qualifications: (1) completed or in-process Ph.D. or D.B.A. in Accounting or related field; (2) record of effective classroom teaching; (3) evidence of ongoing research program. Associate-level candidates should have an established record of scholarly publication. Salary and fringe benefits are competitive, plus free tuition for faculty dependents. Send *curriculum vitae* and names of three references to Dr. Anita Hollander, Search Committee Chair, School of Accounting, University of Tulsa, 600 S. College Avenue, Tulsa, OK 74104; Phone: (918) 631-2786; Fax: (918) 631-2164; Email: anita-hollander@utulsa.edu. Applications accepted until the position is filled. The University of Tulsa, an Equal Opportunity/Affirmative Action Employer, is committed to diversifying its faculty and staff. Members of underrepresented groups are strongly encouraged to apply.

448 MICHIGAN STATE UNIVERSITY is seeking two renowned scholars to fill two newly established chairs in Information Technology (IT) with academic year appointments within The Eli Broad Graduate School of Management. Full Professors or Associate Professors immediately promotable to Full Professor possessing interdisciplinary research records are invited to apply. Remuneration substantially above the salary levels of a Big 10 research professor is available. Candidates should submit a resume, 1–2 research papers, and the names 1–3 scholars in Information Systems who can attest to their scholarship. Resumes and papers should be sent to Professor Severin Grabski, N270 Business College Complex, The Eli Broad Graduate School of Management, Michigan State University, East Lansing, MI 48824-1121. Preliminary inquiries may be directed by telephone: (517) 432-2922 or email: grabski@msu.edu. Deadline for receipt of resumes and papers is October 1, 2000 or until suitable candidates are identified. Michigan State University is a Affirmative Action/Equal Opportunity Institution. Handicappers have the right to request and receive reasonable accommodation.

449 SANTA CLARA UNIVERSITY, Department of Accounting, has multiple openings at the Assistant, Associate, or Full Professor levels for the 2001–2002 school year. Applicants at the Assistant rank should have completed or nearly completed their Ph.D. or D.B.A. in Accounting and should be committed to a research program. Candidates at higher ranks require a completed doctorate and a nationally recognized and continuing record of research and quality teaching. Review of applications will begin November 2, 2000, though applications will continue to be accepted until the positions are filled. Candidates should send a *curriculum vitae*, two letters of recommendation, and a sample of recent research to Professor Jane Ou, Chair of Recruiting Committee, Department of Accounting, Leavey School of Business, Santa Clara University, Santa Clara, CA 95053-0380; Telephone: (408) 554-4085; Fax: (408) 554-5193; Web: http://business.scu.edu/actg. Santa Clara University is an EEO/AA Employer.

450 UNIVERSITY OF TEXAS AT ARLINGTON, Department of Accounting, invites applications for two tenure-track positions at the Assistant/Associate Professor rank or temporary appointments as Visiting Assistant/Associate or Lecturer. Areas of need include Accounting Information Systems, Systems/Audit, and Taxation. Tenure-track positions require a Ph.D. degree, high-quality teaching, publishing in nationally recognized journals, and academic/professional service. Temporary positions require a Ph.D. degree (Visitor) or a master's degree (Lecturer) and high-quality teaching. Professional Accounting experience and certification are highly desirable. Subject to budget approval these positions are available beginning in the Fall 2001. Screening of applicants begins immediately and continues until the positions are filled. Send an application letter and *curriculum vitae* to Martin Taylor, Recruiting Committee Chair, Campus Box 19468, University of Texas at Arlington, Arlington, Texas 76019. Professor Taylor may be contacted by phone: (817) 272-3030 or email: mtaylor@uta.edu. The University of Texas at Arlington is located in the dynamic Dallas/Ft. Worth metroplex area. Both the College and Department of Accounting are AACSB-accredited. UTA is an Equal Opportunity/Affirmative Action Employer.

451 UNIVERSITY OF SOUTH FLORIDA, St. Petersburg Campus, School of Accountancy, invites applications for a nontenure-earning instructor of Accounting for Fall 2001 to teach Principles I and II, possible upper-level courses, and M.B.A. courses. Primary teaching responsibilities are on the St. Petersburg campus with possible assignments on other campuses. Research and service to academic and professional communities expected. Ph.D. with a major concentration in Accounting required and college teaching experience; professional certification desirable. Apply to Dr. Gerald Lander, Chair, Search Committee. University of South Florida, 140 7th Avenue South, St. Petersburg, FL 33701. Submit letter of application, *curriculum vitae*, names, addresses, and telephone numbers of three references, and evidence of scholarly work. Applications must be received by December 1, 2000. According to Florida law, applications and meetings regarding this position are open to the public. USF is an Equal Opportunity/Affirmative Access Institution. For disability accommodations, contact (727) 553-1151/TDD (813) 974-1510 a minimum of five working days in advance.

452 UNIVERSITY OF ILLINOIS, Department of Accountancy, is recruiting faculty for tenure-track appointments at all ranks. Candidates at advanced ranks must possess a doctoral degree, and candidates for Assistant Professor positions must possess or be near completion of a doctoral degree. Applicants for senior positions should have a strong research record and the ability to participate in doctoral education and curriculum development at the undergraduate and graduate levels. In addition, nontenure-track lecturer and visiting positions may become available. Applicants should submit a resume that lists research publications and courses taught. Compensation is competitive and will be commensurate with the appointment level and applicant's record. To ensure full consideration, applications should be received by December 31, 2000. Correspondence and resumes should be sent to Professor Gene Willis, Head, Department of Accountancy, 360 Commerce West, College of Commerce and Business Administration, University of Illinois, 1206 S. Sixth Street, Champaign, IL 61820. The Department of Accountancy is an Affirmative Action Employer and encourages applications from members of minority groups.

453 UNIVERSITY OF PENNSYLVANIA invites applications from qualified persons for positions available July 2001 in Financial Accounting at all professional ranks. A Ph.D. is required. Demonstrated ability or potential for effective teaching and quality research are important considerations. Interested persons should send their resume including educational background, professional experience, publications, personal data, and, if applicable, a dissertation proposal and abstract to Professor Stanley Baiman, Accounting Department, University of Pennsylvania, Suite 2400, Steinberg Hall, Dietrich Hall, Philadelphia, PA 19104-6365. The deadline for applications is January 15, 2001. University of Pennsylvania is an Equal Opportunity/Affirmative Action Employer.

454 AMERICAN UNIVERSITY, Kogod School of Business, invites applications for a tenure-track appointment in Accounting at the Assistant Professor level beginning Fall 2001. The position is subject to final budgetary approval. Applicants should have a Ph.D. in Accounting or should anticipate early completion. Teaching and research interests in Accounting Information Systems are preferred, as is an established record of teaching and research. Experience in mentoring women and minority graduate students is desired. Responsibilities include undergraduate and master's-level teaching, pursuit of scholarly research goals, participation in department, school, and university activities, and student advising. Salary and benefits are competitive. Send applications (including *curriculum vitae*, three letters of recommendation, teaching evaluations, and evidence of scholarly research activity) to Dr. Robert B. Thompson, Kogod School of Business, American University, 4400 Massachusetts Avenue NW, Washington, D.C. 20016-8044. American University, an Equal Opportunity/Affirmative Action Employer, strongly encourages applications from women and minorities.

455 UNIVERSITY OF MISSOURI–ST. LOUIS, College of Business Administration, invites applications for the position of Coordinator of Accounting (equivalent to a department chair). Required qualifications include a doctorate in Accounting or a closely related area and a record of scholarship and teaching appropriate for an appointment with tenure at the rank of Associate or Full Professor. The College currently offers undergraduate and master's degree programs including a B.S. in Accounting and a Master of Accounting. All programs are AACSB-accredited. The successful candidate should have a strong commitment to excellence in teaching and research and to working with the professional community. Interested candidates should contact John J. Anderson, Professor and Interim Coordinator of Accounting, College of Business Administration, University of Missouri–St. Louis, 8001 Natural Bridge Road, St. Louis, MO 63121; Email: jack-anderson@umsl.edu. The University is an Affirmative Action/Equal Opportunity Employer committed to excellence through diversity.

456 GEORGIA STATE UNIVERSITY, School of Accountancy, is recruiting for one or more tenure- and nontenure-track positions to begin August 2001. Late-stage doctoral students, new Ph.D. holders, or experienced faculty members are encouraged to apply for a tenure-track position at the rank of Assistant Professor. All areas will be considered, but Financial Accounting is preferred. Candidates are also sought for a nontenure-track position at the rank of Instructor or Assistant Professor. Those appointed as Instructors must have a Master's degree in Accounting or a related field, those appointed as Assistant Professor must have an earned doctorate in Accounting or a related field. The appointee must possess demonstrated capability in high-level classroom performance at the undergraduate (Instructor and Assistant Professor) and graduate levels (Assistant Professor). Preference given to applications received by January 31, 2001. Positions are contingent on final budget approval by the University. Submit letter of application and *curriculum vitae*, or nominations to Dr. A. Faye Borthick, Chair, Recruiting Committee, School of Accountancy, J. Mack Robinson College of Business, Georgia State University, PO Box 4050, 35 Broad Street, Suite 545, Atlanta, GA 30302-4050. Georgia State University is a unit of the university system of Georgia and is an affirmative Action/Equal Opportunity Education Institution.

457 UNIVERSITY OF CALIFORNIA, DAVIS, Graduate School of Management, invites applications for up to two tenure-track positions in Accounting. It is anticipated that the appointments will be at the Assistant Professor rank. Applications should be able to demonstrate excellence or potential excellence in research and teaching in Financial or Managerial Accounting. Recently ranked as one the top public M.B.A. schools in the nation, the GSM offers an exciting intellectual environment of top research scholars and outstanding professional students. Candidates should have a Ph.D. degree in Accounting or related field. Your letter of application should describe your research and teaching interests and include a resume, evidence of research (papers, dissertation) and teaching, and the names and addresses of three references to Associate Dean Paul Griffin, Graduate School of Management, One Shields Avenue, University of California, Davis, California 95616; Email: acct@gsm.ucdavis.edu. To ensure consideration, applications should be submitted by January 31, 2001. Position open until filled. The University of California is an Affirmative Action/Equal Opportunity Employer with a strong institutional commitment to the achievement of diversity among its faculty and staff.

458 CREIGHTON UNIVERSITY invites applications for the position of Chairperson of its AACSB-accredited Department of Accounting effective Fall 2001. The appointment will be at the Associate or Full Professor rank. Candidates must have an earned Doctorate (Accounting) and professional certification. Candidates should possess a strong record of teaching, research, and publications commensurate with the rank and position of leadership. Teaching and research interests in e-Commerce, Accounting Information Systems, or Auditing preferred. Candidates should provide evidence of an understanding of and commitment to the values of a Catholic/Jesuit education. Send application letter and current *curriculum vitae* to Thomas Shimerda, Creighton University, 2500 California Plaza, Omaha, NE 68178. Application deadline is November 1, 2000. Creighton University is an AA/EEO employer, and seeks a diverse faculty committed to teaching, scholarship, and service, who understand, respect, and contribute to the University's mission and values. Minorities, women, veterans, and persons with disabilities are encouraged to apply.

459 CALIFORNIA STATE UNIVERSITY, SAN MARCOS, invites applications for faculty positions in all Accounting specializations beginning Fall 2001. Tenure-track appointment available, rank open and dependent upon qualifications. A Ph.D. (or ABD with completion of degree requirements prior to appointment) and evidence/promise of strong scholarship and teaching effectiveness are required. CSUSM is located in northern San Diego County. To ensure full consideration, applications need to be received by November 15, 2000. Applications will be accepted until positions are filled. Submit a letter of application, complete resume, and three letters of recommendation to Faculty Recruiting Committee, Center for Accountancy, College of Business Administration, California State University San Marcos, San Marcos, CA 92096-0001. The University has made a strong commitment to the principle of diversity and, in that spirit, seeks a broad spectrum of candidates including women, members of minority groups, and people with disabilities. All positions are subject to final budget approval.

460 SOPHIA UNIVERSITY, TOKYO, seeks applicants for a tenured position in Japanese Studies and Business/Economics to be assumed October 2001 or April 2002. The Faculty will interview specialists in Accounting and Accounting Information Systems, and also in the legal and institutional framework of business. Teaching duties include intermediate and advanced courses in selected topics as well as an introductory course for students of diverse backgrounds. Candidates are persons with Ph.D. or equivalent, a portfolio of research accomplishments, and teaching experience. The language of instruction is English; competence in Japanese is expected. Application materials due at the end of December include account of research interests; *curriculum vitae*; description of courses applicant is prepared to teach. Please send application materials to Professor Nobumitsu Kagami, Dean of Faculty of Comparative Culture, Sophia University, 4 Yonbancho, Chiyoda-ku, Tokyo 102-0081, JAPAN.

461 BARUCH COLLEGE, Stan Ross Department of Accountancy, invites applications for anticipated positions in Accounting, Auditing, and Taxation for tenure-track positions at all ranks. Rank and salary are dependent on qualifications. For positions as an Assistant Professor, candidates should have a doctoral degree in Accounting or be close to completion of that degree. For ranks above Assistant Professor, the requirements include a record of publication, demonstrated teaching effectiveness, and a desire to work with doctoral students. Please submit *curriculum vitae* and recent work of a research proposal, by February 15, 2001, to Professor Masako Darrough, Baruch College, 17 Lexington Avenue, Box E-0725, New York, NY 10010. An AA/EO/IRCA/ADA Employer.

462 PURDUE UNIVERSITY invites applicants for positions in Accounting. Rank is at either the Assistant or Associate Professor level. Appointment begins August 2001. A Ph.D. or D.B.A. is required. Candidates for Assistant Professor must exhibit capacity for quality research and teaching. Candidates for Associate Professor must have an established record of excellence in research, teaching, and service on doctoral dissertation committees. Applications will be reviewed beginning October 15, 2000. Applications should be sent to Professor William Kross, Krannert School of Management, 1310 Krannert Building, Purdue University, West Lafayette, IN 47907-1310; Telephone: (765) 494-4469. Purdue University is an Equal Opportunity/Affirmative Action Employer.

463 COLLEGE OF WILLIAM AND MARY seeks applications for one or two tenure-track positions in Accounting at the Assistant/Associate level beginning Fall 2001. Applicants must have a doctoral degree (or be near completion for Assistant position) and must demonstrate an ability to publish high-quality research. A chaired professorship is a possibility for a suitably qualified candidate at the Associate level. Candidates should send a *curriculum vitae*, samples of scholarly work, teaching evaluations, and two letters of reference to Professor Robert Solomon, Graduate School of Business Administration, College of William and Mary, PO Box 8795, Williamsburg, VA 23187-8795. Review will begin August 14, 2000 and materials will be accepted until an appointment is made. College of William and Mary is an EEO/AA Employer.

464 KENT STATE UNIVERSITY invites applications for a senior-level position with teaching and research emphasis in Financial Accounting, Financial and Managerial Accounting, or Accounting Systems. The position is available Fall 2001; salary/rank are competitive and based on qualifications. Professional certification, evidence of effective undergraduate and graduate teaching, and an appropriate record of discovery/integration research are required. Responsibilities include teaching undergraduate and graduate courses, and participating in the Accounting doctoral program. Individuals with a strong record and interest in external relations may be considered for appointment to a faculty position enriched by external funding. For information or to apply, contact Dr. Richard Brown, Department of Accounting, 550 BSA, Kent State University, Kent, OH 44242; Phone: (330) 672-2545; Fax: (330) 672-2548; Email: dbrown@bsa3.kent.edu. Kent State University is an EEO Employer.

465 KENT STATE UNIVERSITY invites applications for an Assistant Professor position beginning *Fall* 2001. The area of teaching and research preferred is Accounting Systems; applicants with an interest in Financial Accounting or Financial and Managerial Accounting may be considered. A doctorate in Accounting is required; applicants who have defended a dissertation proposal and will be able to make a final dissertation defense by Summer 2001 will be considered. Professional certification is preferred; evidence of the potential for effective undergraduate and graduate teaching and discovery/integration research is required. For information or to apply, contact Dr. Richard Brown, Department of Accounting, 550 BSA, Kent State University, Kent, OH 44242; Phone: (330) 672-2545; Fax: (330) 672-2548; Email: dbrown@bsa3.kent.edu. Kent State University is an EEO Employer.